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THE

MERICAN EPHEMERIS

AND

NAUTICAL ALMANAC

FOR THE YEAR

1913

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PREFACE.

The character of the matter contained in this issue of the American Ephemeris and Nautical Almanac, and its arrangement, are practically the same as in the preceding volume, that for the year 1912, excepting that ephemerides for observations of certain physical phenomena of the Sun and Moon and of the planets Mars and Jupiter, have been inserted in Part III.

The volume is divided into three parts, as follows:

Part I, *Ephemeris for the Meridian of Greenwich*, which gives the ephemerides of the Sun and Moon, the geocentric and heliocentric positions of the major planets, the Sun's coordinates, and other fundamental astronomical data for equidistant intervals of Greenwich mean time.

Part II, *Ephemeris for the Meridian of Washington*, which gives ephemerides of the fixed stars, Sun, Moon, and major planets for transit over the meridian of the Naval Observatory, Washington, which passes midway between the West and East Transit Circles of the Observatory. The mean places of the fixed stars and the data for their reduction are also included in this part.

Part III, *Phenomena*, which contains predictions of phenomena to be observed, with data for their computation. Washington mean time for the meridian of the Naval Observatory is used throughout this part except in a few cases, notably those of eclipses, where Greenwich mean time seems more convenient. Tables for the determination of latitude and azimuth from Polaris, tables for the conversion of time, and an alphabetical list of observatories with their latitudes, longitudes, and other data, are contained in this part.

On November 2, 1910, when I assumed charge of the Nautical Almanac Office, the present volume, with the exception of about 35 pages, was in type, and the computations for these pages were either finished or well advanced. The entire volume was planned and the new matter, appearing in the Ephemeris for the first time with this volume, was selected by my predecessor, Professor Milton Updegraff, U. S. Navy. My connection with it has been confined to rearranging a few pages and writing up some of the explanatory matter.

W. S. EICHELBERGER,
Professor of Mathematics, U. S. Navy,
Director Nautical Almanac.

WASHINGTON, *January, 1911.*

ERRATA.

Ephemeris 1911, in some copies.

Page.					
261,	Dec. 33, Log. Dist.	*for*	9.9815309	*read*	9.9815313
265,	Dec. 31, Log. Dist.	*for*	9.8419039	*read*	9.8419042
308,	β Ursæ Minoris, Ann. Var.	*for*	−0.2096	*read*	−0.2086
407,	Nov. 25, R. A. App. Noon	*for*	36.81	*read*	56.81
419,	Dec. 32, App. Decl.	*for*	23.1	*read*	23.5
425,	Dec. 31, App. R. A.	*for*	33.95	*read*	33.94
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Ephemeris 1912, first edition.

VII,	Third from last line	*for*	−0.0376	*read*	−0.000376
XIII,	Elements of the Planetary Orbits.	*for*	January 0	*read*	January 1
XV,	Jewish era	*for*	5671	*read*	5673
	The Olympiads	*for*	second	*read*	fourth
	Japanese era	*for*	43d	*read*	45th
213,	Second column	*for*	$''$	*read*	$'$
238,	α^1 Geminorum, fifth column	*for*	$\Delta\alpha$	*read*	$\Delta\delta$
239,	Footnote, second column	*for*	ε Hydri	*read*	ϵ Hydræ
243,	Thirty-eighth line	*for*	ζ Libræ	*read*	32 Libræ
	Thirty-eighth line, Mag.	*for*	5.6	*read*	5.9
319,	Last star	*for*	g^2 Eridani	*read*	g Eridani
397,	η Ursæ Maj., $D_\psi\delta$	*for*	−0.04	*read*	−0.4
407,	γ Scorpii, $D'_\psi\alpha$	*for*	+0.1	*read*	+0.01
411,	First star	*for*	ζ^1 Libræ	*read*	32 Libræ
460,	First star	*for*	61^1 Cygni	*read*	61 Cygni *pr.*
465,	ε Pegasi, $D_\psi\delta$	*for*	+0.03	*read*	+0.3
567–70,	Second line	*for*	Jan. 0.764	*read*	Jan. 1.006
570,	φ Aquarii, Proper Motion	*for*	−0.0043	*read*	+0.0015
	φ Aquarii, Proper Motion	*for*	+0.091	*read*	−0.194
610,	Synodic Period, Satellite VII	*for*	260.06	*read*	276.67
636,	Synodic Period, Satellite IX	*for*	580 4.7	*read*	580 2.9
645,	Note, Northern Elongation	*for*	Northern	*read*	Southern
651,	Fifth line	*for*	West. Univ. Pa.	*read*	Univ. of Pittsburgh
703,	First and twenty-first lines	*for*	$\rho \cos \phi$	*read*	$\rho \cos \phi'$

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ANNIVERSARIES AND FESTIVALS, 1913.

New Year's Day	Wednesday,	Jan. 1
Epiphany	Monday,	Jan. 6
Septuagesima Sunday	Sunday,	Jan. 19
Quinquagesima (Shrove Sunday)	Sunday,	Feb. 2
Ash Wednesday	Wednesday,	Feb. 5
Lincoln's Birthday	Wednesday,	Feb. 12
Washington's Birthday	Saturday,	Feb. 22
Palm Sunday	Sunday,	Mar. 16
Good Friday	Friday,	Mar. 21
Easter Sunday	Sunday,	Mar. 23
First Day of Passover	Tuesday,	Apr. 22
Rogation Sunday	Sunday,	Apr. 27
Ascension Day (Holy Thursday)	Thursday,	May 1
Pentecost (Whit Sunday)	Sunday,	May 11
Trinity Sunday	Sunday,	May 18
Corpus Christi	Thursday,	May 22
Memorial Day	Friday,	May 30
Hebrew Pentecost (Shebuoth)	Wednesday,	June 11
Independence Day	Friday,	July 4
Labor Day (except in certain States)	Monday,	Sept. 1
Day of Atonement (Yom Kippur)	Saturday,	Oct. 11
First Day of Tabernacle (Sucoth)	Thursday,	Oct. 16
Election Day (in certain States)	Tuesday,	Nov. 4
Thanksgiving Day	Thursday,	Nov. 27
First Sunday in Advent	Sunday,	Nov. 30
Christmas Day	Thursday,	Dec. 25

INTRODUCTION.

The Ephemeris for the Meridian of Greenwich, comprising Part I of this volume, has been constructed from various tables of the Sun, Moon, and planets, as stated below, and the ephemerides of these bodies for the meridian of Washington contained in Part II have been computed from the same tables.

The Ephemeris of the Sun is constructed from Professor NEWCOMB'S *Tables of the Sun, Astronomical Papers of the American Ephemeris*, Vol. VI, part 1.

The adopted value of the mean equatorial horizontal parallax of the Sun is 8″.80, *Paris Conference, May, 1896.*

The Sun's rectangular equatorial coordinates are computed from the longitudes and latitudes by the following formulæ:

$$\begin{aligned} X &= R\cos\lambda \\ Y &= R\sin\lambda\cos\omega - 19.3\,R\,\beta \\ Z &= R\sin\lambda\sin\omega + 44.5\,R\,\beta \end{aligned}$$

The reductions to mean equinox are computed by the formulæ—

$$\begin{aligned} \Delta X &= +\,Y\sec\omega\,\Delta\lambda\sin 1'' \\ \Delta Y &= -\,X\cos\omega\,\Delta\lambda\sin 1'' + Z\Delta\omega\sin 1'' + 9.1\,\tau R\sin(\lambda + 6^\circ) \\ \Delta Z &= -\,X\sin\omega\,\Delta\lambda\sin 1'' - Y\Delta\omega\sin 1'' - 21.0\,\tau R\sin(\lambda + 6^\circ) \end{aligned}$$

where the numerical coefficients are in units of the seventh place of decimals and

R = the Sun's radius vector,
λ = the Sun's true longitude,
β = the Sun's true latitude, expressed in seconds of arc,
ω = the obliquity of the ecliptic,
$\Delta\lambda$ = the reduction of longitude for precession and nutation from the beginning of the Besselian fictitious year,
$\Delta\omega$ = the reduction of the mean to the apparent obliquity,
τ = the fraction of the year since the beginning of the Besselian fictitious year.

The longitude, latitude, and parallax of the Moon are derived from HANSEN'S *Tables de la Lune* (London, 1857), the mean longitude being corrected as in previous years, beginning with the volume for the year 1883. The statement concerning these corrections which is contained in the volumes from 1883 to 1911, inclusive, is erroneous, in that they have not been computed strictly in accordance with the formula in NEWCOMB'S *Researches on the Motion of the Moon*, part 1, page 268, *Washington Observations*, 1875, Appendix II. That formula is,

$$-\,1''.14 - 29''.17\,\mathrm{T} - 3''.86\,\mathrm{T}^2 - \mathrm{V}_2 - 0''.09\sin\mathrm{A} - 15''.49\cos\mathrm{A},$$

while the expression actually used is,

$$-\,1''.14 - 29''.17\,\mathrm{T} - 3''.76\,\mathrm{T}^2 - \mathrm{V}_2 - 15''.49\cos\mathrm{A}.$$

In these formulæ T is the time in units of 100 years reckoned from 1800.

The ephemerides of Mercury, Venus, and Mars are derived from Professor NEWCOMB's tables of these planets, *Astronomical Papers of the American Ephemeris*, Vol. VI, parts 2, 3, and 4.

The ephemerides of Jupiter and Saturn are derived from the tables constructed in this office by Dr. GEORGE W. HILL, *Astronomical Papers of the American Ephemeris*, Vol. VII, parts 1 and 2.

The ephemerides of Uranus and Neptune are derived from Professor NEWCOMB's tables of these planets, *Astronomical Papers of the American Ephemeris*, Vol. VII, parts 3 and 4.

The nutation used in computing the ephemerides of the Sun, Moon, and planets has been taken from Tables XXXII and XXXIII of NEWCOMB's Tables of the Sun, *Astronomical Papers of the American Ephemeris*, Vol. VI, part 1, and is given at intervals of five days on page 214. The formulæ from which the nutation is computed are as follows, the time interval T being expressed in units of 100 years, reckoned from 1900. See *Tables of the Sun*, page 26.

$$\begin{array}{ll}
\delta\psi = -(17''.234+0''.017\,T)\sin\text{☊} & \delta\varepsilon = +9''.214\cos\text{☊}\\
\qquad +\ 0''.209\sin 2\,\text{☊} & \qquad -0''.090\cos 2\,\text{☊}\\
\qquad -\ 1''.257\sin 2\,L & \qquad +0''.546\cos 2\,L\\
\qquad -\ 0''.049\sin(3\,L+78^\circ.7) & \qquad +0''.021\cos(3\,L+78^\circ.7)\\
\qquad +\ 0''.110\sin(L+75^\circ.3) & \qquad -0''.009\cos(L-78^\circ.7)
\end{array}$$

The formulæ for the nutation used in computing the Besselian and Independent Star Numbers, pages 218–229, are as follows:

$$\begin{array}{ll}
\text{Terms of Long Period.} & \text{Terms of Short Period.}\\
\delta\psi = -(17''.234+0''.017\,T)\sin\text{☊} & -0''.204\sin 2\,\text{☾}\\
\qquad +\ 0''.209\sin 2\,\text{☊} & +0''.011\sin(\text{☾}+\Gamma')\\
\qquad -\ 1''.272\sin 2\,L & +0''.068\sin(\text{☾}-\Gamma')\\
\qquad +\ 0''.126\sin(L-\Gamma) & -0''.034\sin(2\,\text{☾}-\text{☊})\\
\qquad -\ 0''.050\sin(3\,L-\Gamma) & -0''.026\sin(3\,\text{☾}-\Gamma')\\
\qquad +\ 0''.021\sin(L+\Gamma) & +0''.015\sin(\text{☾}-2\,L+\Gamma')\\
\qquad +\ 0''.012\sin(2\,L-\text{☊}) & +0''.006\sin 2\,(\text{☾}-L)\\
\delta\varepsilon = +\ (9''.210+0''.0009\,T)\cos\text{☊} & +0''.088\cos 2\,\text{☾}\\
\qquad -\ 0''.090\cos 2\,\text{☊} & +0''.018\cos(2\,\text{☾}-\text{☊})\\
\qquad +\ 0''.552\cos 2\,L & +0''.011\cos(3\,\text{☾}-\Gamma')\\
\qquad +\ 0''.022\cos(3\,L-\Gamma) & -0''.005\cos(\text{☾}+\Gamma')\\
\qquad -\ 0''.009\cos(L+\Gamma) & \\
\qquad -\ 0''.007\cos(2\,L-\text{☊}) &
\end{array}$$

The meaning of the symbols used and the manner in which these latter formulæ have been employed in computing the ephemerides of the stars, pages 251 to 510, are explained on pages 216 and 217. The slight discrepancy between the terms in 2 L in these two sets of formulæ is due to the correction of an error in the first set. See *Bulletin Astronomique*, 1898, Vol. XV, page 244.

The list of 825 stars contained in Part II has been selected from NEWCOMB's Catalogue of Fundamental Stars, *Astronomical Papers of the American Ephemeris*, Vol. VIII, part 2. The mean places and annual variations of the stars have been taken from NEWCOMB's Catalogue, except that those of ε Hydri, 38 Horologii (G.), and π Centauri have been taken from *Veroeffentlichungen des Koeniglichen Astronomischen Rechen-Instituts zu Berlin*, 1907, No. 33.

The relative accuracy with which the places of the stars are determined in both right ascension and declination may be estimated approximately from the mean errors for the year 1920, given on pages 511–517, and taken from *Astronomical Papers of the American Ephemeris*, Vol. VIII, part 2, pages 370–382.

The constants of aberration, precession, nutation, and obliquity of the ecliptic, used in the reduction of stars to apparent place, are given on pages 213 and 214, and the formulæ for the computation of the Besselian and Independent Star Numbers are given on page 216, the coefficients being those given by Professor NEWCOMB in *Bulletin Astronomique*, 1898, Vol. XV, page 241.

The terms of short period of the nutation depending on the Moon's mean longitude are tabulated for Washington mean midnight of each day on pages 231–232, and have been computed from the formulæ for these terms given above.

The method by which the right ascensions and declinations of the stars interpolated from the 10-day ephemerides (pp. 287–486) are corrected for the effect of these short-period terms is given on page 217.

According to the formulæ on pages 216 and 217 the star constants *a*, *b*, *c*, *d*, *a'*, *b'*, *c'*, *d'* are computed for each star from its mean place at the beginning of the year, but if strict accuracy is required they should be computed from the star's mean place at date, and the following second-order terms should be added to the usual expressions for the reduction from mean to apparent place, namely—

To $\alpha-\alpha_0$

$$\begin{array}{l}
{}^{s} \\
\left.\begin{array}{l}
+0.000\,003\ \tau^2 \sin\alpha \\
-0.000\,149\ \tau^2 \cos\alpha
\end{array}\right\}\tan\delta \\
\left.\begin{array}{l}
-0.000\,0650\ \tau^2 \sin 2\alpha \\
+0.000\,0103 \sin 2\,\Omega \cos 2\alpha \\
-0.000\,0107 \cos 2\,\Omega \sin 2\alpha
\end{array}\right\}\tan^2\delta \\
\left.\begin{array}{l}
+0.000\,0620 \sin 2\odot \cos 2\alpha \\
-0.000\,0622 \cos 2\odot \sin 2\alpha
\end{array}\right\}\sec^2\delta \\
\left.\begin{array}{l}
+0.000\,0513 \sin(\odot+\Omega) \cos 2\alpha \\
-0.000\,0507 \cos(\odot+\Omega) \sin 2\alpha \\
+0.000\,0097 \sin(\odot-\Omega) \cos 2\alpha \\
-0.000\,0053 \cos(\odot-\Omega) \sin 2\alpha
\end{array}\right\}\tan\delta\sec\delta
\end{array}$$

To $\delta-\delta_0$

$$\begin{array}{l}
{}'' \\
\left.\begin{array}{l}
+0.000\,975\ \tau^2 \sin^2\alpha \\
-0.000\,023 \cos 2\,\Omega \\
-0.000\,080 \cos 2\,\Omega \cos 2\alpha \\
-0.000\,077 \sin 2\,\Omega \sin 2\alpha \\
+0.000\,040 \cos 2\odot \\
-0.000\,467 \cos 2\odot \cos 2\alpha \\
-0.000\,465 \sin 2\odot \sin 2\alpha
\end{array}\right\}\tan\delta \\
\left.\begin{array}{l}
-0.000\,039 \cos(\odot+\Omega) \\
-0.000\,380 \cos(\odot+\Omega) \cos 2\alpha \\
-0.000\,385 \sin(\odot+\Omega) \sin 2\alpha \\
-0.000\,380 \cos(\odot-\Omega) \\
-0.000\,040 \cos(\odot-\Omega) \cos 2\alpha \\
-0.000\,072 \sin(\odot-\Omega) \sin 2\alpha
\end{array}\right\}\sin\delta\tan\delta
\end{array}$$

These terms are negligible for stars whose declination is numerically less than 80°, but in computing the apparent places given in the American Ephemeris they have been applied whenever sensible.

The *apparent* places of α Canis Majoris (Sirius), α Canis Minoris (Procyon), α^2 Centauri, and 61 Cygni have been corrected for the effect of annual parallax, the adopted constants of parallax being $0''.38$, $0''.27$, $0''.75$, and $0''.40$, respectively.

The *apparent* places of α Canis Majoris (Sirius), α Canis Minoris (Procyon), and α^2 Centauri, have been corrected for the effect of orbital motion, as tabulated on pages 98 and 99 of *Veroeffentlichungen des Koeniglichen Astronomischen Rechen-Instituts zu Berlin*, 1907, No. 33. AUWER's elements were used for Sirius and Procyon, and SEE's elements for α^2 Centauri. The values of these corrections are—

	Sirius.		Procyon.		α^2 Centauri.	
	1913.0	1914.0	1913.0	1914.0	1913.0	1914.0
$\Delta\alpha$	$-0^s.223$	$-0^s.227$	$-0^s.048$	$-0^s.053$	$+0^s.686$	$+0^s.678$
$\Delta\delta$	$-0''.52$	$-0''.66$	$-0''.57$	$-0''.47$	$+7''.00$	$+6''.76$

[In former issues of the *American Ephemeris*, values differing from the above were used for Sirius and Procyon and no correction was applied to α^2 Centauri.] The *mean* places of these three stars as printed are those derived from NEWCOMB'S Fundamental Catalogue, without correction, and are assumed in each case to be the position of the center of gravity of the system.

The values of $\Delta\alpha$ and $\Delta\delta$ which are given for the companions to the stars γ Andromedæ, ζ Ursæ Majoris and 61 Cygni have been taken from the Greenwich 10-year catalogue for 1890, those for α Crucis from the Cape Catalogue for 1900, and those for α^2 Geminorum from DOBERCK'S elements in the *Astronomische Nachrichten*, 1904, Vol. 166, page 145.

The magnitudes of the stars have, with a few exceptions, been taken from *Annals of the Harvard College Observatory*, Vol. L., 1908.

In general, the names of the stars are the same as in NEWCOMB'S Suggested List of Fundamental Stars, except that the Flamsteed number has been omitted in all cases where Greek or italic letters are available. In some cases the constellation and number of the uranometries of Heis or Gould have been used. In all such cases, Heis or the letter G in parentheses follows the constellation name, as, for example, 5 Cassiopeiæ (Heis) and 38 Horologii (G.).

The stars occulted by the moon, pages 566–569, have been selected from the catalogue of zodiacal stars contained in Vol. VIII, part 3, *Astronomical Papers of the American Ephemeris*, and the mean places for 1913.0 have been derived from the same catalogue.

In Part III the elements of eclipses of the Sun and occultations of stars by the Moon are given in accordance with BESSEL'S method, the special forms employed being a modification of those developed in CHAUVENET'S *Spherical and Practical Astronomy*.

In the computation of the elements of Eclipses, the following corrections to the longitude, latitude, and parallax of the Moon, as given on pages V–XII of the Greenwich Ephemeris, deduced by the late Prof. SIMON NEWCOMB from recent observations of occultations of stars by the Moon, have been applied. These corrections have been assumed in each case to be constant during the eclipse.

G. M. T.		δv	δb	$\delta \pi$
1913		$''$	$''$	$''$
Mar. 22^d	0^h	+ 8.4	+1.0	+0.4
Apr. 6	7	+10.4	+0.9	+0.4
Aug. 31	8	+ 8.6	+1.1	+0.3
Sept. 15	0	+ 9.0	+0.7	+0.3
Sept. 29	18	+ 8.6	+0.5	+0.3

The satellites of Mars are computed from manuscript tables based upon elements deduced by Prof. WALTER S. HARSHMAN, U. S. N.

The eclipses of Jupiter's satellites are computed from a *Continuation of* DAMOISEAU'S *Tables*. The occultations, transits, etc., are computed from WOOLHOUSE'S tables, published in the *British Nautical Almanac* for 1835; Table II of each satellite having been adapted to DAMOISEAU'S tables.

The Vth satellite of Jupiter is computed from manuscript tables based upon unpublished elements deduced from the observations of Prof. E. E. BARNARD.

The differential coordinates of Jupiter's VIth and VIIth satellites have been computed from elements and tables published in *Lick Observatory Bulletin*, 1906, Vol. IV, No. 112, and in *Astronomische Nachrichten*, 1907, Vol. 174, page 359, respectively.

The elongations and conjunctions of the satellites and the positions of the rings of Saturn are computed from manuscript tables based on Prof. H. STRUVE's elements as published in *Beobachtungen der Saturnstrabanten*, Supplement 1, Pulkowa Observations, St. Petersburg, 1888. The differential coordinates of Phœbe have been computed from elements and tables printed in the *Annals of Harvard College Observatory*, 1905, Vol. LIII, No. VI.

The apparent dimensions of the rings of Saturn are computed from BESSEL's data, except those for the dusky ring, which are based on the observations of various astronomers.

The elongations of the satellites of Uranus are computed from the data of Professor NEWCOMB's *Uranian and Neptunian Systems*, *Washington Observations*, 1873, Appendix I.

The elongations of the satellite of Neptune are computed from manuscript tables based upon the late Prof. A. HALL's elements published in the *Astronomical Journal*, 1898, Vol. XIX, page 65.

The adopted apparent semidiameter of the Sun at the Earth's mean distance is $16' \; 1''.50$; while in the computation of eclipses the value given by AUWERS in the *Astronomische Nachrichten*, 1891, Vol. 128, page 367, is employed, viz, $15' \; 59''.63$.

In the computation of the ephemeris for physical observations of the Sun, page 607, the following elements by CARRINGTON have been used:

Inclination of the Sun's equator to the ecliptic	$7^\circ \; 15'$
Longitude of the ascending node of the Sun's equator on the ecliptic	$73^\circ \; 40' + 50''.25 \; (t - 1850)$
Sidereal period of rotation (mean solar days)	$25^d.38$

The apparent semidiameter of the Moon is computed from the Moon's equatorial horizontal parallax, π, by the formula,

$$S = 0.272\,506 \; \pi + 1''.50$$

where the constant 0.272 506 is based on data from occultations given by Mr. J. PETERS in the *Astronomische Nachrichten*, 1895, Vol. 138, page 147; and the constant $1''.50$ is added to cover the average effect of irradiation.

The value of the Moon's semidiameter employed in the computation of eclipses is computed from the formula,

$$S = 0.272\,274 \; \pi$$

The ephemeris for physical observations of the Moon, pages 608–615 has been computed from formulæ and elements given by F. HAYN in *Abhandlungen der K. Sächsischen Gesell. der Wissenschaften*, Vols. 29 and 30, 1904, 1907.

The notation used for the geocentric librations of the Moon is as follows:

I = the mean inclination of the Moon's equator to the ecliptic ($= 1^\circ \; 32'.1$),

☊ = the mean longitude of the Moon's ascending node, or the mean longitude of the descending node of the Moon's equator,

C = the angle at the center of the Moon's disk made by a lunar meridian with the circle of declination, counted from north to east on the apparent disk,

$\lambda, \beta, \alpha, \delta$ = the geocentric longitude, latitude, right ascension, and declination of the Moon,

i, Δ, ☊′, ☾ = the quantities defined on page 212, where their values for the current year are given,

g' = Earth's mean anomaly,

g = Moon's mean anomaly,

ω = Angular distance of Moon's perigee from the ascending node,

b, l = Optical librations in latitude and longitude, respectively,

$\delta b, \delta l$ = Physical librations in latitude and longitude, respectively,

δC = Physical libration of C.

The Moon's geocentric librations in longitude and latitude or, in other words, the earth's selenographic longitude and latitude, are equal to $l + \delta l$ and $b + \delta b$, respectively, and may be found, for any time, by means of the following formulæ, in connection with the tables given o pages 212 and 213:—

$$
\begin{aligned}
\mu &= -0'.617 \sin 2\,(\text{☊} - \lambda)\\
A &= \sin I \cos(\text{☊} - \lambda)\\
\tan B &= \tan I \sin(\text{☊} - \lambda)\\
\lambda' &= \lambda + \mu + Ab\\
b &= B - \beta\\
l &= \lambda' - \text{☾}\\
\sin C &= \sin i\,\frac{\cos(\lambda' + \varDelta - \text{☊})}{\cos\delta} = -\sin i\,\frac{\cos(\alpha - \text{☊}')}{\cos b}\\
\delta b &= +108'' \sin(\omega + l) + 37'' \sin(\omega - l) - 11'' \sin(g + \omega - l)\\
\delta l &= +12'' \sin g - 59'' \sin g' - 18'' \sin 2\omega\\
&\quad - [108'' \cos(\omega + l) - 37'' \cos(\omega - l) + 11'' \cos(g + \omega - l)] \tan b\\
\delta C &= -[108'' \cos(\omega + l) - 37'' \cos(\omega - l) + 11'' \cos(g + \omega - l)] \sec b
\end{aligned}
$$

The Sun's selenographic latitude and longitude have been computed from formulæ the same as those given above except that the heliocentric coordinate of the Moon have been substituted for the geocentric coordinates.

The following elements have been used in computing the ephemerides fo physical observations of the planets Mars and Jupiter:

Position of north pole of Mars	$\alpha = 21^h\ 10^m\ 0^s + 1^s.565(t - 1905)$ $\delta = 54^\circ\ 30'\ 0'' + 12''.60(t - 1905)$
Position of north pole of Jupiter . .	$\alpha = 17^h\ 52^m\ 0^s.84 + 0^s.247(t - 1910)$ $\delta = 64^\circ\ 33'\ 34''.6 - 0''.60(t - 1910)$
Rotation period of Mars	$24^h\ 37^m\ 22^s.65$
Rotation period of Jupiter, Equatorial region	$9^h\ 50^m\ 30^s.004$
Rotation period of Jupiter, Great Red Spot	$9^h\ 55^m\ 40^s.340$
Longitude of Central Meridian of Mars, May 15, 1897, Greenwich Mean Noon	52°.01
Longitude of Central Meridian of Jupiter (Equatorial Region), July 14, 1897, Greenwich Mean Noon	47°.31
Longitude of Great Red Spot from Central Meridian of Jupiter, January 1, 1908, Greenwich Mean Noon	120°.49

The position of the north pole of Mars is as given by LOWELL and CROMMELIN (see *Monthly Notices R. A. S.*, 1905, Vol. 66, page 56), while that of the north pole of Jupiter has been deduced from the position given by DAMOISEAU for 1750 (see *Tables Écliptiques des Satellites de Jupiter*, page (1)). The rotation periods of Mars and of the equatorial region of Jupiter and the longitudes of the central meridians of Mars and of the equatorial region of Jupiter are according to MARTH (see *Monthly Notices R. A. S.*, 1896, Vol. 56, pages 395–403 and 517–524). The rotation period of the Great Red Spot of Jupiter is a recent value by BARNARD, and its longitude from the Central Meridian is deduced from observations by BARNARD published in *Astronomische Nachrichten*, 1908, Vol. 178, page 390.

The adopted semidiameters of the planets are given on page xv, and their stellar magnitudes have been computed from formulæ given by Dr. G. MUELLER in *Publicationen des Astrophysikalischen Observatoriums zu Potsdam*, 1893, Vol. 8, page 366.

In the list of observatories, pages 670–679, the latitudes given are in most cases astronomical. In some instances they have been determined by geodetic triangulation from other points. The reductions from geographic to geocentric latitude, $\varphi' - \varphi$, and the distance from the center of the earth, ρ, are computed from the formulæ for CLARKE's Spheroid of 1866 as given on page xiv.

CHRONOLOGICAL ERAS AND CYCLES.

CHRONOLOGICAL ERAS.

HE YEAR 1913, WHICH COMPRISES THE LATTER PART OF THE 137TH AND THE BEGINNING OF THE 138TH YEAR OF THE INDEPENDENCE OF THE UNITED STATES OF AMERICA, CORRESPONDS TO—

The year 6626 of the Julian Period;

" 7421–7422 of the Byzantine era, the year 7422 commencing on September 1;

" 5673–5674 of the Jewish era, the year 5674 commencing on October 2, or, more exactly, at sunset on October 1;

" 2666 since the foundation of Rome, according to VARRO;

" 2660 since the beginning of the era of NABONASSAR, which has been assigned to Wednesday, the 26th of February of the 3967th year of the Julian Period; corresponding, in the notation of chronologists, to the 747th, and, in the notation of astronomers, to the 746th year before the birth of CHRIST;

" 2689 of the Olympiads, or the first year of the 673d Olympiad, commencing in July, 1913, if we fix the era of the Olympiads at 775½ years before CHRIST, or near the beginning of July of the year 3938 of the Julian Period;

" 2225 of the Grecian era, or the era of the SELEUCIDÆ, which began near the vernal equinox of the year, −311 = B. C. 312, = 4402 of the Julian Period;

" 1629 of the era of DIOCLETIAN;

" 2573 of the Japanese era and to the 46th year of the period entitled "Meiji."

The year 1332 of the Mohammedan era, or the era of the Hegira, begins on he 30th day of November, 1913.

The first day of January of the year 1913 is the 2,419,769th day since the commencement of the Julian Period.

CHRONOLOGICAL CYCLES.

Dominical Letter	E	Solar Cycle	18
Epact	22	Roman Indiction	11
Lunar Cycle or Golden Number	14	Julian Period	6626

ASTRONOMICAL CONSTANTS.

	″	
Solar Parallax	8.80	Paris Conference.
Constant of Nutation	9.21	
Constant of Aberration	20.47	
General Precession	$50''.2564+0''.000\,222(t-1900)$	Newcomb.
Obliquity of the Ecliptic	$23^\circ\ 27'\ 8''.26-0''.4684(t-1900)$	

Equatorial Horizontal Parallax of the Moon . . . . $57'\ 2''.63$* (Newcomb).

Mean distance Earth to Moon 384 395 kilometers = 238 851 miles, or 60.2669 radii.

Mean distance Earth to Sun 149 499 935 kilometers = 92 894 767 statute miles.

Velocity of light 299 860 kilometers = 186 324 statute miles per second (Newcomb and Michelson).

Light travels unit distance in $498^s.566$.

Gaussian Gravitation Constant, †$k=0.017\,202\,099=3\,548''.187\,61$.

Acceleration in one sec. due to gravity, $g=\overset{m}{9.8060}-\overset{m}{0.0260}\cos 2\varphi-\frac{2h}{R}g$.‡	Helmert.
Length of seconds pendulum, $l=\overset{m}{0.993\,549}-\overset{m}{0.002\,631}\cos 2\varphi-\frac{2h}{R}l$.‡	

Length of the year:

	d	
Tropical (ordinary)	365.242 198 79 − 0.000 000 0614 (t − 1900)	Newcomb.
Sidereal	365.256 360 42 + 0.000 000 0011 (t − 1900)	
Anomalistic . . .	365.259 641 34 + 0.000 000 0304 (t − 1900)	
Eclipse	346.620 000 + 0.000 000 36 (t − 1900)	

Length of the month:

	d	d	h	m	s	
Synodical (ordinary)	29.530 588	= 29	12	44	2.8	Hansen.
Tropical	27.321 582	= 27	7	43	4.7	
Sidereal	27.321 661	= 27	7	43	11.5	
Anomalistic	27.554 550	= 27	13	18	33.1	
Nodical	27.212 219	= 27	5	5	35.7	

Length of the day:

	h	m	s	
Sidereal	23	56	4.091	of mean solar time.
Mean Solar	24	3	56.555	of sidereal time.

Dimensions of the Earth (Clarke's Spheroid of 1866):

Equatorial Radius, $a=6378.206$ kilometers or 3963.23 statute miles.

Polar Radius, $b=6356.584$ " or 3949.79 " "

Flattening, $\frac{a-b}{a}=\frac{1}{295.0}$

Logarithm of the eccentricity $\frac{\sqrt{a^2-b^2}}{a}=\log e=8.915\,251\,28$

Logarithm radius $=\log\rho=9.999\,2645+0.000\,7374\cos 2\varphi-0.000\,0019\cos 4\varphi$.

Reduction from geographic latitude φ to geocentric latitude φ',

$$\varphi'-\varphi=-11'\ 40''.44\sin 2\varphi+1''.19\sin 4\varphi.$$

1 meter = 3.280 8333 feet. 1 foot = 0.304 8006 meters.

1 statute mile = 0.868 392 nautical or geographical miles.

1 nautical mile = 1.151 553 statute miles.

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* Used in the computation of eclipses. The parallax used in the computation of the ephemeris of the Moon contained in this volume is $57'\ 2''.23$ (Hansen).

† k^2 is the acceleration due to the Sun's attraction at the mean distance of the Earth from the Sun, which is also the astronomical unit of distance, the unit of time being one mean solar day.

‡ φ = latitude, h = elevation above sea level in meters, and $\log R=6.80416$.

ASTRONOMICAL CONSTANTS.

SEMIDIAMETERS OF THE SUN, MOON, AND PLANETS.

Name.	At unit Distance.	At mean least Distance.	In Kilometers.	In Statute Miles.	Authority.
	′ ″	″			
Sun	15 59.63	. .	695 533.61	432 183.68	Auwers.
Moon	15 32.58*	. .	1 737.96	1 079.91	Newcomb.
Mercury	3.34	5.45	2 420.82	1 504.24	Le Verrier.
Venus	8.55	30.90	6 197.01	3 850.67	Peirce.
Mars	5.05	9.64	3 660.22	2 274.37	Peirce.
Jupiter (Equatorial)	1 40.20	23.84	72 624.56	45 127.16	Am. Eph.
Jupiter (Polar)	1 34.12	22.40	68 217.80	42 388.90	Peirce.
Saturn (Equatorial)	1 24.88	9.94	61 520.69	38 227.48	Barnard.
Saturn (Polar)	1 17.47	9.07	56 149.95	34 890.23	Barnard.
Uranus	33.52	1.84	24 295.16	15 096.43	Am. Eph.
Neptune	38.66	1.33	28 020.61	17 411.34	Am. Eph.

ELEMENTS OF THE PLANETARY ORBITS FOR THE EPOCH 1913—January 0^d G. M. T.

Name.	Mean Distance.	Sidereal Period.	Mean daily Motion.	Synodic Period.	Eccentricity.
			″		
☿ Mercury	0.387 099	0.240 85	14 732.420	0.317 26	0.205 6169
♀ Venus	0.723 331	0.615 21	5 767.670	1.598 72	0.006 8145
⊕ Earth	1.000 000	1.000 04	3 548.193	. . .	0.016 7456
♂ Mars	1.523 688	1.880 89	1 886.519	2.135 39	0.093 3207
♃ Jupiter	5.202 803	11.862 23	299.128	1.092 11	0.048 3586
♄ Saturn	9.538 843	29.457 72	120.455	1.035 18	0.055 8447
⛢ Uranus	19.190 978	84.015 29	42.23	1.012 09	0.047 0809
♆ Neptune	30.070 672	164.788 29	21.53	1.006 14	0.008 5415

Name.	Inclination to the Ecliptic.	Mean Longitude of the Node.	Mean Longitude of the Perihelion.	Mean Longitude at the Epoch.	Logarithm of Mass in unit of Sun's Mass.
	° ′ ″	° ′ ″	° ′ ″	° ′ ″	
☿ Mercury	7 0 11.2	47 18 0.0	76 6 6.9	168 47 6.67	3.221 8487 − 10
♀ Venus	3 23 37.5	75 53 47.8	130 20 48.7	29 51 50.61	4.389 3398 − 10
⊕ Earth	. . .	. . .	101 26 39.6	99 33 0.81	4.482 2896 − 10
♂ Mars	1 51 1.0	48 53 10.3	334 27 28.1	262 2 14.99	3.509 5499 − 10
♃ Jupiter	1 18 28.9	99 34 9.6	12 55 15.9	272 44 54.03	6.979 9082 − 10
♄ Saturn	2 29 30.4	112 53 49.1	91 20 36.5	65 36 47.08	6.455 7335 − 10
⛢ Uranus	0 46 21.8	73 33 20.4	169 15 23.6	299 14 48.27	5.640 7528 − 10
♆ Neptune	1 46 40.8	130 49 18.4	43 52 9.2	113 36 21.82	5.705 5338 − 10

The elements of the four inner planets are derived from those given by Newcomb in Vol. VI of the Astronomical Papers of the American Ephemeris, and are the same as those used in computing the ephemerides of these planets. Those of Jupiter, Saturn, Uranus, and Neptune are taken from Vol. VII of the Astronomical Papers for the epoch of the tables. They are reduced to 1913 by applying Le Verrier's variations, and can not be regarded as being strictly identical with the elements used in computing the ephemerides of those planets in this volume.

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*At mean distance. See Ast. Papers Am. Eph., Vol. IX, p. 40. For the values of the semidiameter used in this volume see page xi.

SYMBOLS AND ABBREVIATIONS.

SIGNS OF THE PLANETS, ETC.

☉	The Sun.	♂	Mars.
☾	The Moon.	♃	Jupiter.
☿	Mercury.	♄	Saturn.
♀	Venus.	⛢	Uranus.
⊕	The Earth.	♆	Neptune.

SIGNS OF THE ZODIAC.

Spring Signs.	1.	♈	Aries.	Autumn Signs.	7.	♎	Libra.
	2.	♉	Taurus.		8.	♏	Scorpius.
	3.	♊	Gemini.		9.	♐	Sagittarius.
Summer Signs.	4.	♋	Cancer.	Winter Signs.	10.	♑	Capricornus.
	5.	♌	Leo.		11.	♒	Aquarius.
	6.	♍	Virgo.		12.	♓	Pisces.

ASPECTS.

☌	Conjunction, or having the same Longitude or Right Ascension.
□	Quadrature, or differing ±90° in Longitude or Right Ascension.
☍	Opposition, or differing 180° in Longitude or Right Ascension.

ABBREVIATIONS.

☊	Ascending Node.	°	Degrees.
☋	Descending Node.	′	Minutes of Arc.
N.	North.	″	Seconds of Arc.
S.	South.	^{h}	Hours.
E.	East.	^{m}	Minutes of Time.
W.	West.	^{s}	Seconds of Time.

PART I.

ASTRONOMICAL EPHEMERIS FOR THE MERIDIAN OF GREENWICH.

JANUARY, 1913.

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Wed.	1	18 45 41.24	11.050	S. 23 2 14.8	+12.06	16 17.89	71.06	3 33.52	1.187
Thur.	2	18 50 6.25	11.035	22 57 11.7	13.20	16 17.89	71.02	4 1.89	1.175
Fri.	3	18 54 30.93	11.020	22 51 41.1	14.34	16 17.88	70.97	4 29.93	1.161
Sat.	4	18 58 55.25	11.005	22 45 43.2	+15.48	16 17.87	70.92	4 57.61	1.145
SUN.	5	19 3 19.17	10.988	22 39 18.1	16.61	16 17.85	70.86	5 24.91	1.128
Mon.	6	19 7 42.66	10.969	22 32 26.0	17.73	16 17.83	70.80	5 51.78	1.110
Tues.	7	19 12 5.70	10.949	22 25 7.2	+18.84	16 17.81	70.73	6 18.18	1.090
Wed.	8	19 16 28.25	10.928	22 17 21.8	19.94	16 17.78	70.66	6 44.09	1.069
Thur.	9	19 20 50.27	10.905	22 9 10.0	21.03	16 17.75	70.59	7 9.49	1.046
Fri.	10	19 25 11.74	10.882	22 0 32.1	+22.11	16 17.72	70.52	7 34.34	1.023
Sat.	11	19 29 32.64	10.858	21 51 28.5	23.18	16 17.68	70.44	7 58.61	0.999
SUN.	12	19 33 52.94	10.832	21 41 59.4	24.24	16 17.63	70.36	8 22.28	0.973
Mon.	13	19 38 12.60	10.805	21 32 5.0	+25.29	16 17.58	70.28	8 45.32	0.946
Tues.	14	19 42 31.60	10.778	21 21 45.7	26.32	16 17.52	70.19	9 7.71	0.919
Wed.	15	19 46 49.94	10.749	21 11 1.8	27.34	16 17.46	70.10	9 29.42	0.891
Thur.	16	19 51 7.59	10.720	20 59 53.5	+28.35	16 17.40	70.01	9 50.45	0.862
Fri.	17	19 55 24.52	10.690	20 48 21.2	29.34	16 17.34	69.91	10 10.78	0.832
Sat.	18	19 59 40.72	10.660	20 36 25.3	30.32	16 17.27	69.81	10 30.38	0.801
SUN.	19	20 3 56.19	10.629	20 24 6.1	+31.28	16 17.19	69.71	10 49.23	0.770
Mon.	20	20 8 10.90	10.597	20 11 24.0	32.23	16 17.10	69.61	11 7.33	0.739
Tues.	21	20 12 24.85	10.565	19 58 19.2	33.17	16 17.01	69.50	11 24.67	0.707
Wed.	22	20 16 38.03	10.533	19 44 52.0	+34.09	16 16.91	69.40	11 41.25	0.675
Thur.	23	20 20 50.44	10.501	19 31 2.9	35.00	16 16.81	69.29	11 57.06	0.643
Fri.	24	20 25 2.07	10.468	19 16 52.2	35.90	16 16.70	69.18	12 12.09	0.611
Sat.	25	20 29 12.91	10.435	19 2 20.3	+36.77	16 16.58	69.07	12 26.34	0.578
SUN.	26	20 33 22.97	10.402	18 47 27.4	37.63	16 16.46	68.96	12 39.80	0.545
Mon.	27	20 37 32.24	10.369	18 32 13.9	38.48	16 16.34	68.85	12 52.48	0.512
Tues.	28	20 41 40.73	10.336	18 16 40.2	+39.31	16 16.20	68.74	13 4.37	0.479
Wed.	29	20 45 48.42	10.303	18 0 46.7	40.13	16 16.06	68.62	13 15.47	0.446
Thur.	30	20 49 55.30	10.270	17 44 33.8	40.93	16 15.92	68.51	13 25.77	0.413
Fri.	31	20 54 1.37	10.236	17 28 1.9	41.72	16 15.78	68.39	13 35.26	0.379
Sat.	32	20 58 6.64	10.202	S. 17 11 11.3	+42.49	16 15.63	68.28	13 43.94	0.346

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting $0^s.19$ from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

JANUARY, 1913.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Wed.	1	18 45 40.58	11.046	S. 23 2 15.5	+12.05	3 33.45	1.187	18 42 7.14
Thur.	2	18 50 5.50	11.032	22 57 12.6	13.19	4 1.81	1.175	18 46 3.69
Fri.	3	18 54 30.10	11.017	22 51 42.2	14.33	4 29.85	1.161	18 50 0.25
Sat.	4	18 58 54.34	11.002	22 45 44.5	+15.47	4 57.53	1.145	18 53 56.81
SUN.	5	19 3 18.18	10.985	22 39 19.6	16.60	5 24.81	1.128	18 57 53.37
Mon.	6	19 7 41.60	10.966	22 32 27.7	17.72	5 51.67	1.110	19 1 49.93
Tues.	7	19 12 4.56	10.946	22 25 9.1	+18.83	6 18.07	1.090	19 5 46.49
Wed.	8	19 16 27.03	10.925	22 17 23.9	19.93	6 43.98	1.069	19 9 43.05
Thur.	9	19 20 48.97	10.903	22 9 12.4	21.02	7 9.37	1.046	19 13 39.60
Fri.	10	19 25 10.37	10.880	22 0 34.9	+22.10	7 34.21	1.023	19 17 36.16
Sat.	11	19 29 31.20	10.856	21 51 31.6	23.17	7 58.47	0.999	19 21 32.72
SUN.	12	19 33 51.43	10.830	21 42 2.8	24.23	8 22.14	0.973	19 25 29.28
Mon.	13	19 38 11.02	10.803	21 32 8.7	+25.27	8 45.18	0.946	19 29 25.84
Tues.	14	19 42 29.96	10.776	21 21 49.7	26.30	9 7.57	0.919	19 33 22.40
Wed.	15	19 46 48.24	10.747	21 11 6.1	27.32	9 29.28	0.891	19 37 18.96
Thur.	16	19 51 5.83	10.718	20 59 58.1	+28.33	9 50.31	0.862	19 41 15.51
Fri.	17	19 55 22.71	10.688	20 48 26.2	29.32	10 10.63	0.832	19 45 12.07
Sat.	18	19 59 38.86	10.658	20 36 30.7	30.30	10 30.23	0.801	19 49 8.63
SUN.	19	20 3 54.28	10.627	20 24 11.8	+31.26	10 49.09	0.770	19 53 5.19
Mon.	20	20 8 8.94	10.595	20 11 30.0	32.21	11 7.19	0.739	19 57 1.74
Tues.	21	20 12 22.84	10.563	19 58 25.5	33.15	11 24.54	0.707	20 0 58.30
Wed.	22	20 16 35.98	10.531	19 44 58.7	+34.07	11 41.13	0.675	20 4 54.86
Thur.	23	20 20 48.35	10.499	19 31 9.9	34.98	11 56.94	0.643	20 8 51.42
Fri.	24	20 24 59.94	10.467	19 16 59.5	35.88	12 11.97	0.611	20 12 47.98
Sat.	25	20 29 10.75	10.434	19 2 27.9	+36.76	12 26.22	0.578	20 16 44.53
SUN.	26	20 33 20.78	10.401	18 47 35.3	37.62	12 39.69	0.545	20 20 41.09
Mon.	27	20 37 30.02	10.368	18 32 22.2	38.47	12 52.38	0.512	20 24 37.65
Tues.	28	20 41 38.47	10.335	18 16 48.8	+39.30	13 4.27	0.479	20 28 34.20
Wed.	29	20 45 46.13	10.302	18 0 55.6	40.12	13 15.37	0.446	20 32 30.76
Thur.	30	20 49 52.99	10.269	17 44 43.0	40.92	13 25.67	0.413	20 36 27.32
Fri.	31	20 53 59.05	10.236	17 28 11.3	41.71	13 35.17	0.379	20 40 23.88
Sat.	32	20 58 4.30	10.202	S. 17 11 20.9	+42.48	13 43.86	0.346	20 44 20.43

Note.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 Hour,
+9ˢ.8565.
(Table III.)

AT GREENWICH MEAN NOON.								
		THE SUN'S						
Day of the Month.	Day of the Year.	True Longitude. λ	True Longitude. λ′	Diff. for 1 Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		° ′ ″	′ ″	″	″			h m s
1	1	280 30 12.2	30 14.0	152.93	−0.18	9.992 6576	+ 0.4	5 17 0.79
2	2	281 31 22.8	31 24.4	152.94	0.31	9.992 6594	1.2	5 13 4.88
3	3	282 32 33.6	32 35.0	152.95	0.41	9.992 6632	2.0	5 9 8.96
4	4	283 33 44.6	33 45.8	152.96	−0.48	9.992 6688	+ 2.7	5 5 13.05
5	5	284 34 55.7	34 56.7	152.96	0.53	9.992 6762	3.4	5 1 17.14
6	6	285 36 6.7	36 7.5	152.96	0.56	9.992 6853	4.1	4 57 21.22
7	7	286 37 17.7	37 18.2	152.95	−0.56	9.992 6961	+ 4.9	4 53 25.31
8	8	287 38 28.4	38 28.8	152.94	0.52	9.992 7087	5.6	4 49 29.40
9	9	288 39 38.8	39 39.0	152.93	0.47	9.992 7230	6.3	4 45 33.48
10	10	289 40 48.9	40 48.8	152.91	−0.39	9.992 7390	+ 7.0	4 41 37.57
11	11	290 41 58.5	41 58.2	152.89	0.29	9.992 7568	7.8	4 37 41.66
12	12	291 43 7.5	43 7.1	152.87	0.18	9.992 7765	8.6	4 33 45.75
13	13	292 44 16.0	44 15.4	152.84	−0.06	9.992 7981	+ 9.4	4 29 49.84
14	14	293 45 23.8	45 23.0	152.81	+0.06	9.992 8217	10.2	4 25 53.92
15	15	294 46 30.8	46 29.9	152.78	0.18	9.992 8474	11.1	4 21 58.01
16	16	295 47 37.1	47 36.0	152.75	+0.29	9.992 8752	+12.0	4 18 2.10
17	17	296 48 42.6	48 41.3	152.71	0.39	9.992 9053	13.0	4 14 6.19
18	18	297 49 47.2	49 45.7	152.68	0.46	9.992 9379	14.1	4 10 10.28
19	19	298 50 50.9	50 49.2	152.64	+0.51	9.992 9730	+15.2	4 6 14.36
20	20	299 51 53.8	51 51.9	152.61	0.53	9.993 0107	16.3	4 2 18.45
21	21	300 52 55.8	52 53.7	152.57	0.52	9.993 0512	17.4	3 58 22.54
22	22	301 53 57.0	53 54.7	152.54	+0.48	9.993 0944	+18.6	3 54 26.63
23	23	302 54 57.4	54 55.0	152.50	0.40	9.993 1404	19.8	3 50 30.71
24	24	303 55 57.1	55 54.6	152.47	0.30	9.993 1892	20.9	3 46 34.80
25	25	304 56 56.2	56 53.5	152.45	+0.18	9.993 2408	+22.0	3 42 38.89
26	26	305 57 54.6	57 51.7	152.42	+0.05	9.993 2949	23.0	3 38 42.98
27	27	306 58 52.4	58 49.3	152.39	−0.09	9.993 3515	24.0	3 34 47.07
28	28	307 59 49.5	59 46.3	152.36	−0.21	9.993 4103	+24.9	3 30 51.16
29	29	309 0 46.0	0 42.6	152.34	0.33	9.993 4713	25.8	3 26 55.25
30	30	310 1 41.8	1 38.2	152.31	0.44	9.993 5342	26.6	3 22 59.34
31	31	311 2 36.8	2 33.0	152.28	0.52	9.993 5990	27.3	3 19 3.42
32	32	312 3 31.0	3 27.1	152.24	−0.58	9.993 6655	+28.0	3 15 7.51

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ′ are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour, $-9^{s}.8296$. (Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 41.1	15 36.2	57 28.11	−1.541	57 9.91	−1.490	19 49.6	2.04	23.8
2	15 31.4	15 26.8	56 52.36	1.433	56 35.52	1.371	20 39.5	2.12	24.8
3	15 22.4	15 18.2	56 19.43	1.309	56 4.09	1.246	21 31.6	2.21	25.8
4	15 14.3	15 10.5	55 49.50	−1.185	55 35.64	−1.125	22 25.4	2.26	26.8
5	15 6.9	15 3.5	55 22.49	1.065	55 10.08	1.002	23 19.6	2.24	27.8
6	15 0.3	14 57.4	54 58.44	0.937	54 47.61	0.866	6	. .	28.8
7	14 54.7	14 52.2	54 37.65	−0.793	54 28.61	−0.712	0 12.6	2.16	0.1
8	14 50.0	14 48.1	54 20.60	0.621	54 13.74	0.521	1 3.0	2.04	1.1
9	14 46.6	14 45.5	54 8.15	0.410	54 3.95	0.288	1 50.1	1.89	2.1
10	14 44.8	14 44.5	54 1.29	−0.154	54 0.31	−0.007	2 34.0	1.77	3.1
11	14 44.7	14 45.5	54 1.17	+0.153	54 4.02	+0.324	3 15.4	1.68	4.1
12	14 46.9	14 48.8	54 8.99	0.505	54 16.20	0.697	3 55.0	1.63	5.1
13	14 51.4	14 54.7	54 25.75	+0.894	54 37.69	+1.095	4 34.1	1.63	6.1
14	14 58.6	15 3.2	54 52.06	1.299	55 8.86	1.501	5 13.7	1.68	7.1
15	15 8.4	15 14.3	55 28.06	1.698	55 49.56	1.884	5 55.3	1.79	8.1
16	15 20.7	15 27.7	56 13.20	+2.053	56 38.73	+2.199	6 40.0	1.95	9.1
17	15 35.1	15 42.8	57 5.87	2.319	57 34.24	2.403	7 29.4	2.17	10.1
18	15 50.7	15 58.7	58 3.37	2.442	58 32.67	2.433	8 24.4	2.41	11.1
19	16 6.6	16 14.2	59 1.54	+2.372	59 29.32	+2.249	9 25.0	2.63	12.1
20	16 21.2	16 27.6	59 55.27	2.066	60 18.67	1.824	10 29.7	2.73	13.1
21	16 33.1	16 37.5	60 38.80	1.526	60 55.08	1.180	11 35.2	2.70	14.1
22	16 40.8	16 42.7	61 6.97	+0.797	61 14.11	+0.390	12 38.4	2.54	15.1
23	16 43.3	16 42.6	61 16.32	−0.022	61 13.60	−0.428	13 37.2	2.35	16.1
24	16 40.5	16 37.3	61 6.14	0.811	60 54.27	1.161	14 31.4	2.18	17.1
25	16 33.0	16 27.8	60 38.49	−1.463	60 19.40	−1.711	15 22.1	2.06	18.1
26	16 21.9	16 15.4	59 57.66	1.905	59 33.92	2.044	16 10.5	1.99	19.1
27	16 8.6	16 1.5	59 8.84	2.129	58 43.03	2.165	16 58.3	2.00	20.1
28	15 54.4	15 47.5	58 17.05	−2.160	57 51.36	−2.116	17 46.6	2.04	21.1
29	15 40.7	15 34.1	57 26.36	2.046	57 2.37	1.951	18 36.3	2.11	22.1
30	15 27.9	15 22.1	56 39.63	1.838	56 18.31	1.714	19 28.0	2.19	23.1
31	15 16.7	15 11.8	55 58.53	1.582	55 40.33	1.450	20 21.2	2.24	24.1
32	15 7.2	15 3.1	55 23.73	−1.317	55 8.73	−1.184	21 15.1	2.24	25.1

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 1.			
	h m s	s	° ′ ″	″
0	13 53 21.86	2.0690	S. 13 46 46.2	14.141
1	13 55 26.07	2.0715	14 0 52.2	14.062
2	13 57 30.44	2.0741	14 14 53.6	13.983
3	13 59 34.96	2.0766	14 28 50.2	13.903
4	14 1 39.63	2.0792	14 42 42.0	13.823
5	14 3 44.47	2.0820	14 56 29.0	13.742
6	14 5 49.47	2.0847	15 10 11.0	13.659
7	14 7 54.64	2.0876	15 23 48.1	13.576
8	14 9 59.98	2.0904	15 37 20.1	13.491
9	14 12 5.49	2.0933	15 50 47.0	13.405
10	14 14 11.18	2.0963	16 4 8.7	13.317
11	14 16 17.05	2.0993	16 17 25.1	13.229
12	14 18 23.10	2.1024	16 30 36.2	13.141
13	14 20 29.34	2.1055	16 43 42.0	13.051
14	14 22 35.76	2.1086	16 56 42.3	12.959
15	14 24 42.37	2.1118	17 9 37.1	12.867
16	14 26 49.18	2.1151	17 22 26.4	12.774
17	14 28 56.18	2.1183	17 35 10.0	12.679
18	14 31 3.38	2.1217	17 47 47.9	12.584
19	14 33 10.78	2.1250	18 0 20.1	12.488
20	14 35 18.38	2.1284	18 12 46.5	12.391
21	14 37 26.19	2.1319	18 25 7.0	12.292
22	14 39 34.21	2.1353	18 37 21.6	12.193
23	14 41 42.43	2.1387	S. 18 49 30.2	12.093
	THURSDAY 2.			
0	14 43 50.86	2.1422	S. 19 1 32.8	11.992
1	14 45 59.50	2.1458	19 13 29.2	11.889
2	14 48 8.36	2.1494	19 25 19.5	11.786
3	14 50 17.43	2.1530	19 37 3.5	11.681
4	14 52 26.72	2.1566	19 48 41.2	11.575
5	14 54 36.22	2.1602	20 0 12.5	11.468
6	14 56 45.94	2.1638	20 11 37.4	11.361
7	14 58 55.88	2.1675	20 22 55.8	11.252
8	15 1 6.04	2.1712	20 34 7.7	11.143
9	15 3 16.43	2.1750	20 45 13.0	11.033
10	15 5 27.04	2.1787	20 56 11.7	10.922
11	15 7 37.87	2.1823	21 7 3.6	10.808
12	15 9 48.92	2.1860	21 17 48.7	10.695
13	15 12 0.19	2.1898	21 28 27.0	10.581
14	15 14 11.69	2.1936	21 38 58.4	10.466
15	15 16 23.42	2.1973	21 49 22.9	10.350
16	15 18 35.37	2.2010	21 59 40.4	10.233
17	15 20 47.54	2.2047	22 9 50.9	10.115
18	15 22 59.93	2.2084	22 19 54.2	9.995
19	15 25 12.55	2.2122	22 29 50.3	9.875
20	15 27 25.39	2.2159	22 39 39.2	9.754
21	15 29 38.45	2.2196	22 49 20.8	9.632
22	15 31 51.74	2.2232	22 58 55.1	9.510
23	15 34 5.25	2.2269	23 8 22.0	9.386
24	15 36 18.98	2.2305	S. 23 17 41.4	9.261

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 3.			
	h m s	s	° ′ ″	″
0	15 36 18.98	2.2305	S. 23 17 41.4	9.261
1	15 38 32.92	2.2342	23 26 53.3	9.136
2	15 40 47.08	2.2378	23 35 57.7	9.010
3	15 43 1.46	2.2415	23 44 54.5	8.882
4	15 45 16.06	2.2450	23 53 43.6	8.754
5	15 47 30.86	2.2485	24 2 25.0	8.626
6	15 49 45.88	2.2520	24 10 58.7	8.497
7	15 52 1.10	2.2554	24 19 24.6	8.366
8	15 54 16.53	2.2589	24 27 42.6	8.234
9	15 56 32.17	2.2624	24 35 52.7	8.102
10	15 58 48.02	2.2657	24 43 54.8	7.968
11	16 1 4.06	2.2690	24 51 48.9	7.835
12	16 3 20.30	2.2723	24 59 35.0	7.701
13	16 5 36.74	2.2756	25 7 13.0	7.566
14	16 7 53.37	2.2787	25 14 42.9	7.430
15	16 10 10.19	2.2818	25 22 4.6	7.293
16	16 12 27.19	2.2849	25 29 18.1	7.156
17	16 14 44.38	2.2880	25 36 23.3	7.018
18	16 17 1.75	2.2910	25 43 20.2	6.878
19	16 19 19.30	2.2939	25 50 8.7	6.739
20	16 21 37.02	2.2967	25 56 48.9	6.600
21	16 23 54.91	2.2996	26 3 20.7	6.459
22	16 26 12.97	2.3023	26 9 44.0	6.317
23	16 28 31.19	2.3050	S. 26 15 58.8	6.175
	SATURDAY 4.			
0	16 30 49.57	2.3077	S. 26 22 5.0	6.032
1	16 33 8.11	2.3102	26 28 2.7	5.890
2	16 35 26.79	2.3126	26 33 51.8	5.746
3	16 37 45.62	2.3150	26 39 32.2	5.601
4	16 40 4.59	2.3173	26 45 3.9	5.457
5	16 42 23.70	2.3196	26 50 27.0	5.312
6	16 44 42.94	2.3217	26 55 41.3	5.166
7	16 47 2.30	2.3237	27 0 46.9	5.019
8	16 49 21.79	2.3257	27 5 43.6	4.872
9	16 51 41.39	2.3277	27 10 31.6	4.726
10	16 54 1.12	2.3296	27 15 10.7	4.577
11	16 56 20.94	2.3313	27 19 40.9	4.430
12	16 58 40.87	2.3330	27 24 2.3	4.282
13	17 1 0.90	2.3345	27 28 14.8	4.133
14	17 3 21.01	2.3360	27 32 18.3	3.983
15	17 5 41.22	2.3374	27 36 12.8	3.834
16	17 8 1.50	2.3387	27 39 58.4	3.685
17	17 10 21.86	2.3398	27 43 35.0	3.535
18	17 12 42.28	2.3409	27 47 2.6	3.385
19	17 15 2.77	2.3420	27 50 21.2	3.234
20	17 17 23.32	2.3429	27 53 30.7	3.083
21	17 19 43.92	2.3437	27 56 31.2	2.932
22	17 22 4.56	2.3443	27 59 22.6	2.781
23	17 24 25.24	2.3450	28 2 4.9	2.630
24	17 26 45.96	2.3455	S. 28 4 38.2	2.479

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SUNDAY 5.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	17 26 45.96	2.3455	S.28 4 38.2	2.479
1	17 29 6.70	2.3458	28 7 2.4	2.327
2	17 31 27.46	2.3462	28 9 17.5	2.176
3	17 33 48.24	2.3463	28 11 23.5	2.024
4	17 36 9.02	2.3464	28 13 20.4	1.872
5	17 38 29.81	2.3464	28 15 8.2	1.721
6	17 40 50.59	2.3462	28 16 46.9	1.569
7	17 43 11.36	2.3460	28 18 16.5	1.417
8	17 45 32.11	2.3457	28 19 37.0	1.267
9	17 47 52.85	2.3453	28 20 48.5	1.115
10	17 50 13.55	2.3448	28 21 50.8	0.962
11	17 52 34.22	2.3441	28 22 44.0	0.812
12	17 54 54.84	2.3432	28 23 28.2	0.661
13	17 57 15.41	2.3424	28 24 3.3	0.509
14	17 59 35.93	2.3415	28 24 29.3	0.358
15	18 1 56.39	2.3404	28 24 46.3	0.208
16	18 4 16.78	2.3392	28 24 54.3	−0.057
17	18 6 37.09	2.3378	28 24 53.2	+0.092
18	18 8 57.32	2.3365	28 24 43.1	0.243
19	18 11 17.47	2.3350	28 24 24.0	0.392
20	18 13 37.52	2.3333	28 23 56.0	0.542
21	18 15 57.47	2.3317	28 23 19.0	0.692
22	18 18 17.32	2.3298	28 22 33.0	0.840
23	18 20 37.05	2.3279	S.28 21 38.2	0.988

MONDAY 6.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	18 22 56.67	2.3259	S.28 20 34.4	1.137
1	18 25 16.16	2.3237	28 19 21.8	1.284
2	18 27 35.52	2.3216	28 18 0.3	1.432
3	18 29 54.75	2.3192	28 16 30.0	1.578
4	18 32 13.83	2.3167	28 14 50.9	1.724
5	18 34 32.76	2.3142	28 13 3.1	1.869
6	18 36 51.53	2.3116	28 11 6.6	2.014
7	18 39 10.15	2.3090	28 9 1.3	2.159
8	18 41 28.61	2.3062	28 6 47.4	2.304
9	18 43 46.89	2.3032	28 4 24.8	2.448
10	18 46 4.99	2.3002	28 1 53.6	2.591
11	18 48 22.91	2.2972	27 59 13.9	2.733
12	18 50 40.65	2.2940	27 56 25.6	2.876
13	18 52 58.19	2.2907	27 53 28.8	3.017
14	18 55 15.53	2.2873	27 50 23.6	3.157
15	18 57 32.67	2.2840	27 47 10.0	3.297
16	18 59 49.61	2.2805	27 43 48.0	3.436
17	19 2 6.33	2.2768	27 40 17.7	3.574
18	19 4 22.83	2.2732	27 36 39.1	3.712
19	19 6 39.11	2.2694	27 32 52.2	3.850
20	19 8 55.16	2.2656	27 28 57.1	3.987
21	19 11 10.98	2.2617	27 24 53.8	4.122
22	19 13 26.57	2.2577	27 20 42.4	4.257
23	19 15 41.91	2.2537	27 16 23.0	4.391
24	19 17 57.01	2.2496	S.27 11 55.5	4.524

TUESDAY 7.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	19 17 57.01	2.2496	S.27 11 55.5	4.524
1	19 20 11.86	2.2454	27 7 20.1	4.657
2	19 22 26.46	2.2412	27 2 36.7	4.789
3	19 24 40.80	2.2369	26 57 45.4	4.920
4	19 26 54.89	2.2326	26 52 46.3	5.049
5	19 29 8.71	2.2281	26 47 39.5	5.178
6	19 31 22.26	2.2236	26 42 24.9	5.307
7	19 33 35.54	2.2191	26 37 2.6	5.435
8	19 35 48.55	2.2146	26 31 32.7	5.562
9	19 38 1.29	2.2099	26 25 55.2	5.687
10	19 40 13.74	2.2052	26 20 10.3	5.811
11	19 42 25.91	2.2004	26 14 17.9	5.936
12	19 44 37.79	2.1956	26 8 18.0	6.059
13	19 46 49.38	2.1908	26 2 10.8	6.181
14	19 49 0.69	2.1860	25 55 56.3	6.302
15	19 51 11.70	2.1811	25 49 34.6	6.422
16	19 53 22.42	2.1761	25 43 5.7	6.541
17	19 55 32.83	2.1711	25 36 29.7	6.659
18	19 57 42.95	2.1662	25 29 46.6	6.777
19	19 59 52.77	2.1611	25 22 56.5	6.893
20	20 2 2.28	2.1560	25 15 59.5	7.008
21	20 4 11.49	2.1509	25 8 55.6	7.122
22	20 6 20.39	2.1457	25 1 44.8	7.236
23	20 8 28.98	2.1407	S.24 54 27.3	7.348

WEDNESDAY 8.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	20 10 37.27	2.1355	S.24 47 3.0	7.460
1	20 12 45.24	2.1302	24 39 32.1	7.570
2	20 14 52.90	2.1251	24 31 54.6	7.679
3	20 17 0.25	2.1198	24 24 10.6	7.787
4	20 19 7.28	2.1146	24 16 20.1	7.896
5	20 21 14.00	2.1094	24 8 23.1	8.002
6	20 23 20.41	2.1041	24 0 19.8	8.107
7	20 25 26.49	2.0988	23 52 10.2	8.212
8	20 27 32.26	2.0936	23 43 54.4	8.315
9	20 29 37.72	2.0883	23 35 32.4	8.417
10	20 31 42.86	2.0830	23 27 4.3	8.519
11	20 33 47.68	2.0777	23 18 30.1	8.619
12	20 35 52.18	2.0724	23 9 50.0	8.718
13	20 37 56.37	2.0672	23 1 3.9	8.817
14	20 40 0.24	2.0618	22 52 12.0	8.914
15	20 42 3.79	2.0566	22 43 14.2	9.011
16	20 44 7.03	2.0513	22 34 10.7	9.106
17	20 46 9.95	2.0461	22 25 1.5	9.200
18	20 48 12.56	2.0409	22 15 46.7	9.293
19	20 50 14.86	2.0357	22 6 26.3	9.386
20	20 52 16.84	2.0304	21 57 0.4	9.477
21	20 54 18.51	2.0252	21 47 29.0	9.567
22	20 56 19.87	2.0201	21 37 52.3	9.657
23	20 58 20.92	2.0149	21 28 10.2	9.746
24	21 0 21.66	2.0097	S.21 18 22.8	9.832

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 9.					SATURDAY 11.				
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	21 0 21.66	2.0097	S.21 18 22.8	9.832	0	22 31 33.92	1.8085	S.12 3 56.5	12.927
1	21 2 22.09	2.0046	21 8 30.3	9.918	1	22 33 22.34	1.8056	11 50 59.5	12.971
2	21 4 22.21	1.9995	20 58 32.6	10.003	2	22 35 10.59	1.8027	11 38 0.0	13.013
3	21 6 22.03	1.9945	20 48 29.9	10.087	3	22 36 58.67	1.8000	11 24 57.9	13.056
4	21 8 21.55	1.9894	20 38 22.1	10.172	4	22 38 46.59	1.7974	11 11 53.3	13.097
5	21 10 20.76	1.9843	20 28 9.3	10.254	5	22 40 34.36	1.7947	10 58 46.2	13.138
6	21 12 19.67	1.9793	20 17 51.6	10.335	6	22 42 21.96	1.7921	10 45 36.7	13.177
7	21 14 18.28	1.9744	20 7 29.1	10.415	7	22 44 9.41	1.7897	10 32 24.9	13.217
8	21 16 16.60	1.9695	19 57 1.8	10.494	8	22 45 56.72	1.7872	10 19 10.7	13.256
9	21 18 14.62	1.9645	19 46 29.8	10.573	9	22 47 43.88	1.7848	10 5 54.2	13.293
10	21 20 12.34	1.9597	19 35 53.0	10.651	10	22 49 30.90	1.7826	9 52 35.5	13.330
11	21 22 9.78	1.9548	19 25 11.7	10.727	11	22 51 17.79	1.7804	9 39 14.6	13.366
12	21 24 6.92	1.9500	19 14 25.8	10.802	12	22 53 4.55	1.7782	9 25 51.6	13.402
13	21 26 3.78	1.9452	19 3 35.4	10.877	13	22 54 51.18	1.7762	9 12 26.4	13.437
14	21 28 0.35	1.9405	18 52 40.5	10.951	14	22 56 37.69	1.7742	8 58 59.2	13.471
15	21 29 56.64	1.9358	18 41 41.3	11.023	15	22 58 24.08	1.7722	8 45 29.9	13.504
16	21 31 52.65	1.9312	18 30 37.7	11.096	16	23 0 10.35	1.7702	8 31 58 7	13.537
17	21 33 48.39	1.9267	18 19 29.8	11.167	17	23 1 56.51	1.7685	8 18 25.5	13.568
18	21 35 43.85	1.9220	18 8 17.7	11.236	18	23 3 42.57	1.7667	8 4 50.5	13.599
19	21 37 39.03	1.9175	17 57 1.5	11.305	19	23 5 28.52	1.7651	7 51 13.6	13.631
20	21 39 33.95	1.9131	17 45 41.1	11.373	20	23 7 14.38	1.7635	7 37 34.8	13.661
21	21 41 28.60	1.9086	17 34 16.7	11.440	21	23 9 0.14	1.7619	7 23 54.3	13.690
22	21 43 22.98	1.9042	17 22 48.3	11.507	22	23 10 45.81	1.7605	7 10 12.0	13.718
23	21 45 17.10	1.8998	S.17 11 15.9	11.573	23	23 12 31.40	1.7591	S. 6 56 28.1	13.746
FRIDAY 10.					SUNDAY 12.				
0	21 47 10.96	1.8955	S.16 59 39.7	11.636	0	23 14 16.90	1.7578	S. 6 42 42.5	13.773
1	21 49 4.56	1.8912	16 47 59.6	11.700	1	23 16 2.33	1.7566	6 28 55.3	13.800
2	21 50 57.91	1.8871	16 36 15.7	11.762	2	23 17 47.69	1.7554	6 15 6.5	13.826
3	21 52 51.01	1.8829	16 24 28.1	11.824	3	23 19 32.98	1.7543	6 1 16.2	13.850
4	21 54 43.86	1.8788	16 12 36.8	11.885	4	23 21 18.21	1.7533	5 47 24.4	13.875
5	21 56 36.47	1.8747	16 0 41.9	11.945	5	23 23 3.38	1.7523	5 33 31.2	13.899
6	21 58 28.83	1.8707	15 48 43.4	12.004	6	23 24 48.49	1.7514	5 19 36.6	13.922
7	22 0 20.96	1.8668	15 36 41.4	12.062	7	23 26 33.55	1.7507	5 5 40.6	13.944
8	22 2 12.85	1.8629	15 24 35.9	12.120	8	23 28 18.57	1.7500	4 51 43.3	13.966
9	22 4 4.51	1.8592	15 12 27.0	12.177	9	23 30 3.55	1.7493	4 37 44.7	13.987
10	22 5 55.95	1.8554	15 0 14.7	12.232	10	23 31 48.49	1.7487	4 23 44.8	14.007
11	22 7 47.16	1.8516	14 47 59.1	12.287	11	23 33 33.40	1.7482	4 9 43.8	14.027
12	22 9 38.14	1.8479	14 35 40.2	12.342	12	23 35 18.28	1.7478	3 55 41.6	14.046
13	22 11 28.91	1.8443	14 23 18.1	12.395	13	23 37 3.14	1.7475	3 41 38.3	14.064
14	22 13 19.46	1.8407	14 10 52.8	12.447	14	23 38 47.98	1.7472	3 27 33.9	14.082
15	22 15 9.80	1.8372	13 58 24.4	12.498	15	23 40 32.81	1.7470	3 13 28.4	14.100
16	22 16 59.93	1.8338	13 45 53.0	12.549	16	23 42 17.62	1.7468	2 59 21.9	14.116
17	22 18 49.86	1.8304	13 33 18.5	12.600	17	23 44 2.43	1.7469	2 45 14.5	14.132
18	22 20 39.58	1.8271	13 20 41.0	12.649	18	23 45 47.25	1.7470	2 31 6.1	14.147
19	22 22 29.11	1.8238	13 8 0.6	12.697	19	23 47 32.07	1.7470	2 16 56.9	14.161
20	22 24 18.44	1.8207	12 55 17.4	12.744	20	23 49 16.89	1.7472	2 2 46.8	14.175
21	22 26 7.59	1.8176	12 42 31.3	12.792	21	23 51 1.73	1.7475	1 48 35.9	14.188
22	22 27 56.55	1.8144	12 29 42.4	12.837	22	23 52 46.59	1.7478	1 34 24.2	14.201
23	22 29 45.32	1.8114	12 16 50.8	12.882	23	23 54 31.47	1.7483	1 20 11.8	14.212
24	22 31 33.92	1.8085	S.12 3 56.5	12.927	24	23 56 16.39	1.7489	S. 1 5 58.8	14.222

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 13.					WEDNESDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	23 56 16.39	1.7489	S. 1 5 58.8	14.222	0	1 22 22.39	1.8715	N. 10 16 16.5	13.912
1	23 58 1.34	1.7494	0 51 45.1	14.233	1	1 24 14.82	1.8762	10 30 10.4	13.885
2	23 59 46.32	1.7501	0 37 30.8	14.243	2	1 26 7.53	1.8809	10 44 2.7	13.857
3	0 1 31.35	1.7508	0 23 15.9	14.253	3	1 28 0.53	1.8857	10 57 53.2	13.828
4	0 3 16.42	1.7517	S. 0 9 0.4	14.262	4	1 29 53.83	1.8907	11 11 42.1	13.799
5	0 5 1.55	1.7526	N. 0 5 15.5	14.269	5	1 31 47.42	1.8958	11 25 29.1	13.768
6	0 6 46.73	1.7536	0 19 31.9	14.277	6	1 33 41.32	1.9009	11 39 14.3	13.737
7	0 8 31.98	1.7547	0 33 48.7	14.282	7	1 35 35.53	1.9062	11 52 57.6	13.705
8	0 10 17.29	1.7558	0 48 5.8	14.288	8	1 37 30.06	1.9115	12 6 38.9	13.671
9	0 12 2.68	1.7571	1 2 23.3	14.294	9	1 39 24.91	1.9168	12 20 18.1	13.637
10	0 13 48.14	1.7583	1 16 41.1	14.298	10	1 41 20.08	1.9223	12 33 55.3	13.602
11	0 15 33.68	1.7598	1 30 59.1	14.302	11	1 43 15.59	1.9280	12 47 30.3	13.564
12	0 17 19.31	1.7612	1 45 17.3	14.305	12	1 45 11.44	1.9337	13 1 3.0	13.526
13	0 19 5.03	1.7628	1 59 35.7	14.307	13	1 47 7.63	1.9394	13 14 33.4	13.487
14	0 20 50.85	1.7645	2 13 54.2	14.309	14	1 49 4.17	1.9453	13 28 1.5	13.447
15	0 22 36.77	1.7662	2 28 12.8	14.310	15	1 51 1.06	1.9512	13 41 27.1	13.406
16	0 24 22.79	1.7680	2 42 31.4	14.310	16	1 52 58.31	1.9572	13 54 50.2	13.363
17	0 26 8.93	1.7699	2 56 50.0	14.310	17	1 54 55.92	1.9633	14 8 10.7	13.320
18	0 27 55.18	1.7719	3 11 8.6	14.308	18	1 56 53.91	1.9696	14 21 28.6	13.276
19	0 29 41.56	1.7740	3 25 27.0	14.306	19	1 58 52.27	1.9758	14 34 43.8	13.230
20	0 31 28.06	1.7761	3 39 45.3	14.304	20	2 0 51.01	1.9822	14 47 56.2	13.183
21	0 33 14.69	1.7783	3 54 3.5	14.301	21	2 2 50.13	1.9887	15 1 5.8	13.135
22	0 35 1.46	1.7807	4 8 21.4	14.297	22	2 4 49.65	1.9952	15 14 12.5	13.086
23	0 36 48.37	1.7831	N. 4 22 39.1	14.292	23	2 6 49.56	2.0018	N. 15 27 16.1	13.035
	TUESDAY 14.					THURSDAY 16.			
0	0 38 35.43	1.7856	N. 4 36 56.4	14.286	0	2 8 49.87	2.0085	N. 15 40 16.6	12.982
1	0 40 22.64	1.7882	4 51 13.4	14.280	1	2 10 50.58	2.0153	15 53 14.0	12.930
2	0 42 10.01	1.7908	5 5 30.0	14.272	2	2 12 51.71	2.0222	16 6 8.2	12.875
3	0 43 57.54	1.7935	5 19 46.1	14.264	3	2 14 53.25	2.0292	16 18 59.0	12.819
4	0 45 45.23	1.7963	5 34 1.7	14.256	4	2 16 55.21	2.0362	16 31 46.5	12.762
5	0 47 33.10	1.7993	5 48 16.8	14.247	5	2 18 57.60	2.0433	16 44 30.5	12.704
6	0 49 21.15	1.8023	6 2 31.4	14.237	6	2 21 0.41	2.0505	16 57 11.0	12.644
7	0 51 9.38	1.8054	6 16 45.3	14.226	7	2 23 3.66	2.0579	17 9 47.8	12.582
8	0 52 57.80	1.8086	6 30 58.5	14.213	8	2 25 7.36	2.0653	17 22 20.9	12.520
9	0 54 46.41	1.8118	6 45 10.9	14.201	9	2 27 11.50	2.0727	17 34 50.2	12.456
10	0 56 35.22	1.8152	6 59 22.6	14.188	10	2 29 16.09	2.0802	17 47 15.6	12.391
11	0 58 24.23	1.8187	7 13 33.5	14.174	11	2 31 21.13	2.0878	17 59 37.1	12.324
12	1 0 13.46	1.8222	7 27 43.5	14.158	12	2 33 26.63	2.0955	18 11 54.5	12.256
13	1 2 2.90	1.8258	7 41 52.5	14.142	13	2 35 32.59	2.1033	18 24 7.8	12.186
14	1 3 52.56	1.8295	7 56 0.6	14.127	14	2 37 39.02	2.1112	18 36 16.8	12.114
15	1 5 42.44	1.8332	8 10 7.7	14.109	15	2 39 45.93	2.1191	18 48 21.5	12.042
16	1 7 32.55	1.8372	8 24 13.7	14.090	16	2 41 53.31	2.1270	19 0 21.8	11.967
17	1 9 22.90	1.8412	8 38 18.5	14.071	17	2 44 1.17	2.1350	19 12 17.6	11.892
18	1 11 13.49	1.8452	8 52 22.2	14.051	18	2 46 9.51	2.1432	19 24 8.9	11.815
19	1 13 4.33	1.8494	9 6 24.6	14.030	19	2 48 18.35	2.1514	19 35 55.5	11.736
20	1 14 55.42	1.8536	9 20 25.8	14.008	20	2 50 27.68	2.1596	19 47 37.2	11.655
21	1 16 46.76	1.8579	9 34 25.6	13.985	21	2 52 37.50	2.1678	19 59 14.0	11.572
22	1 18 38.37	1.8623	9 48 24.0	13.962	22	2 54 47.82	2.1762	20 10 45.9	11.490
23	1 20 30.24	1.8668	10 2 21.0	13.937	23	2 56 58.65	2.1847	20 22 12.8	11.405
24	1 22 22.39	1.8715	N. 10 16 16.5	13.912	24	2 59 9.98	2.1931	N. 20 33 34.5	11.317

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 17.					SUNDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	2 59 9.98	2.1931	N.20 33 34.5	11.317	0	4 54 42.33	2.6151	N.27 22 43.6	5.012
1	3 1 21.82	2.2017	20 44 50.9	11.229	1	4 57 19.47	2.6227	27 27 39.0	4.835
2	3 3 34.18	2.2103	20 56 2.0	11.139	2	4 59 57.06	2.6302	27 32 23.8	4.657
3	3 5 47.06	2.2190	21 7 7.6	11.047	3	5 2 35.09	2.6375	27 36 57.8	4.476
4	3 8 0.46	2.2277	21 18 7.7	10.954	4	5 5 13.56	2.6447	27 41 20.9	4.294
5	3 10 14.38	2.2363	21 29 2.1	10.858	5	5 7 52.46	2.6518	27 45 33.1	4.111
6	3 12 28.82	2.2452	21 39 50.7	10.761	6	5 10 31.78	2.6587	27 49 34.3	3.926
7	3 14 43.80	2.2541	21 50 33.4	10.662	7	5 13 11.51	2.6655	27 53 24.3	3.739
8	3 16 59.31	2.2629	22 1 10.1	10.562	8	5 15 51.64	2.6722	27 57 2.9	3.550
9	3 19 15.35	2.2718	22 11 40.8	10.460	9	5 18 32.18	2.6788	28 0 30.2	3.361
10	3 21 31.93	2.2807	22 22 5.3	10.356	10	5 21 13.10	2.6851	28 3 46.2	3.170
11	3 23 49.04	2.2897	22 32 23.5	10.250	11	5 23 54.39	2.6912	28 6 50.6	2.977
12	3 26 6.70	2.2988	22 42 35.3	10.142	12	5 26 36.05	2.6973	28 9 43.4	2.782
13	3 28 24.90	2.3078	22 52 40.6	10.032	13	5 29 18.07	2.7032	28 12 24.5	2.587
14	3 30 43.64	2.3168	23 2 39.2	9.921	14	5 32 0.43	2.7088	28 14 53.8	2.390
15	3 33 2.92	2.3260	23 12 31.1	9.808	15	5 34 43.13	2.7143	28 17 11.3	2.192
16	3 35 22.76	2.3352	23 22 16.2	9.693	16	5 37 26.15	2.7196	28 19 16.9	1.993
17	3 37 43.14	2.3442	23 31 54.3	9.576	17	5 40 9.48	2.7247	28 21 10.5	1.792
18	3 40 4.07	2.3534	23 41 25.3	9.457	18	5 42 53.12	2.7297	28 22 52.0	1.590
19	3 42 25.55	2.3626	23 50 49.2	9.337	19	5 45 37.05	2.7345	28 24 21.3	1.387
20	3 44 47.58	2.3717	24 0 5.8	9.215	20	5 48 21.26	2.7391	28 25 38.5	1.184
21	3 47 10.16	2.3809	24 9 15.0	9.090	21	5 51 5.74	2.7434	28 26 43.4	0.979
22	3 49 33.29	2.3901	24 18 16.6	8.963	22	5 53 50.47	2.7476	28 27 36.0	0.773
23	3 51 56.97	2.3992	N.24 27 10.6	8.835	23	5 56 35.45	2.7516	N.28 28 16.2	0.567
	SATURDAY 18.					MONDAY 20.			
0	3 54 21.19	2.4083	N.24 35 56.8	8.705	0	5 59 20.66	2.7553	N.28 28 44.0	0.359
1	3 56 45.97	2.4175	24 44 35.2	8.573	1	6 2 6.09	2.7589	28 28 59.3	+0.150
2	3 59 11.29	2.4266	24 53 5.6	8.439	2	6 4 51.73	2.7622	28 29 2.0	−0.060
3	4 1 37.16	2.4357	25 1 27.9	8.303	3	6 7 37.56	2.7653	28 28 52.1	0.270
4	4 4 3.58	2.4448	25 9 42.0	8.166	4	6 10 23.57	2.7682	28 28 29.6	0.481
5	4 6 30.54	2.4539	25 17 47.8	8.026	5	6 13 9.75	2.7709	28 27 54.4	0.692
6	4 8 58.05	2.4629	25 25 45.1	7.884	6	6 15 56.08	2.7734	28 27 6.5	0.904
7	4 11 26.09	2.4718	25 33 33.9	7.741	7	6 18 42.56	2.7757	28 26 5.9	1.116
8	4 13 54.67	2.4808	25 41 14.0	7.595	8	6 21 29.17	2.7777	28 24 52.6	1.329
9	4 16 23.79	2.4897	25 48 45.3	7.447	9	6 24 15.89	2.7796	28 23 26.4	1.543
10	4 18 53.44	2.4986	25 56 7.7	7.298	10	6 27 2.71	2.7812	28 21 47.4	1.757
11	4 21 23.62	2.5073	26 3 21.1	7.147	11	6 29 49.63	2.7826	28 19 55.6	1.970
12	4 23 54.32	2.5161	26 10 25.4	6.994	12	6 32 36.63	2.7838	28 17 51.0	2.184
13	4 26 25.55	2.5248	26 17 20.4	6.839	13	6 35 23.69	2.7847	28 15 33.5	2.399
14	4 28 57.30	2.5334	26 24 6.1	6.682	14	6 38 10.80	2.7854	28 13 3.1	2.614
15	4 31 29.56	2.5420	26 30 42.3	6.523	15	6 40 57.94	2.7858	28 10 19.8	2.829
16	4 34 2.34	2.5505	26 37 8.9	6.362	16	6 43 45.10	2.7862	28 7 23.6	3.043
17	4 36 35.62	2.5589	26 43 25.8	6.200	17	6 46 32.28	2.7862	28 4 14.6	3.257
18	4 39 9.41	2.5672	26 49 32.9	6.036	18	6 49 19.45	2.7860	28 0 52.7	3.472
19	4 41 43.69	2.5754	26 55 30.1	5.870	19	6 52 6.60	2.7856	27 57 17.9	3.687
20	4 44 18.46	2.5835	27 1 17.3	5.702	20	6 54 53.72	2.7850	27 53 30.3	3.900
21	4 46 53.71	2.5916	27 6 54.3	5.532	21	6 57 40.80	2.7842	27 49 29.9	4.114
22	4 49 29.45	2.5996	27 12 21.1	5.361	22	7 0 27.82	2.7832	27 45 16.6	4.328
23	4 52 5.66	2.6073	27 17 37.6	5.187	23	7 3 14.78	2.7819	27 40 50.5	4.541
24	4 54 42.33	2.6151	N.27 22 43.6	5.012	24	7 6 1.65	2.7803	N.27 36 11.7	4.753

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 21.					THURSDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	7 6 1.65	2.7803	N.27 36 11.7	4.753	0	9 14 30.95	2.5268	N.20 4 32.0	13.426
1	7 8 48.42	2.7787	27 31 20.1	4.966	1	9 17 2.34	2.5194	19 51 2.4	13.560
2	7 11 35.09	2.7768	27 26 15.8	5.177	2	9 19 33.28	2.5121	19 37 24.8	13.692
3	7 14 21.64	2.7747	27 20 58.8	5.388	3	9 22 3.79	2.5048	19 23 39.4	13.820
4	7 17 8.06	2.7724	27 15 29.2	5.598	4	9 24 33.86	2.4974	19 9 46.4	13.946
5	7 19 54.33	2.7698	27 9 47.0	5.808	5	9 27 3.48	2.4900	18 55 45.9	14.070
6	7 22 40.44	2.7672	27 3 52.2	6.017	6	9 29 32.66	2.4827	18 41 38.0	14.192
7	7 25 26.39	2.7643	26 57 45.0	6.224	7	9 32 1.41	2.4754	18 27 22.9	14.311
8	7 28 12.16	2.7612	26 51 25.3	6.432	8	9 34 29.71	2.4680	18 13 0.7	14.428
9	7 30 57.74	2.7579	26 44 53.2	6.637	9	9 36 57.57	2.4607	17 58 31.5	14.543
10	7 33 43.11	2.7544	26 38 8.8	6.842	10	9 39 24.99	2.4534	17 43 55.5	14.655
11	7 36 28.27	2.7508	26 31 12.2	7.045	11	9 41 51.98	2.4462	17 29 12.9	14.765
12	7 39 13.21	2.7470	26 24 3.4	7.248	12	9 44 18.53	2.4389	17 14 23.7	14.873
13	7 41 57.91	2.7429	26 16 42.4	7.450	13	9 46 44.65	2.4317	16 59 28.1	14.978
14	7 44 42.36	2.7387	26 9 9.4	7.649	14	9 49 10.33	2.4244	16 44 26.3	15.081
15	7 47 26.56	2.7344	26 1 24.5	7.848	15	9 51 35.58	2.4172	16 29 18.4	15.182
16	7 50 10.49	2.7299	25 53 27.7	8.046	16	9 54 0.40	2.4102	16 14 4.5	15.280
17	7 52 54.15	2.7252	25 45 19.0	8.242	17	9 56 24.80	2.4032	15 58 44.8	15.375
18	7 55 37.52	2.7204	25 36 58.6	8.437	18	9 58 48.78	2.3962	15 43 19.5	15.468
19	7 58 20.60	2.7154	25 28 26.6	8.630	19	10 1 12.34	2.3891	15 27 48.6	15.560
20	8 1 3.37	2.7103	25 19 43.0	8.822	20	10 3 35.47	2.3821	15 12 12.3	15.649
21	8 3 45.84	2.7052	25 10 48.0	9.012	21	10 5 58.19	2.3752	14 56 30.7	15.737
22	8 6 27.99	2.6998	25 1 41.6	9.200	22	10 8 20.50	2.3684	14 40 43.9	15.821
23	8 9 9.81	2.6942	N.24 52 24.0	9.387	23	10 10 42.40	2.3616	N.14 24 52.2	15.902
	WEDNESDAY 22.					FRIDAY 24.			
0	8 11 51.29	2.6885	N.24 42 55.2	9.572	0	10 13 3.89	2.3548	N.14 8 55.7	15.982
1	8 14 32.43	2.6827	24 33 15.4	9.755	1	10 15 24.98	2.3482	13 52 54.4	16.059
2	8 17 13.22	2.6768	24 23 24.6	9.937	2	10 17 45.67	2.3416	13 36 48.6	16.133
3	8 19 53.65	2.6708	24 13 22.9	10.117	3	10 20 5.97	2.3350	13 20 38.4	16.206
4	8 22 33.72	2.6647	24 3 10.5	10.295	4	10 22 25.87	2.3285	13 4 23.9	16.277
5	8 25 13.42	2.6585	23 52 47.5	10.471	5	10 24 45.39	2.3221	12 48 5.2	16.345
6	8 27 52.74	2.6522	23 42 14.0	10.645	6	10 27 4.52	2.3157	12 31 42.5	16.411
7	8 30 31.68	2.6457	23 31 30.1	10.817	7	10 29 23.28	2.3095	12 15 15.9	16.475
8	8 33 10.23	2.6392	23 20 35.9	10.987	8	10 31 41.66	2.3032	11 58 45.5	16.536
9	8 35 48.39	2.6327	23 9 31.6	11.156	9	10 33 59.67	2.2971	11 42 11.6	16.594
10	8 38 26.16	2.6261	22 58 17.2	11.323	10	10 36 17.31	2.2910	11 25 34.2	16.652
11	8 41 3.52	2.6192	22 46 52.8	11.487	11	10 38 34.59	2.2850	11 8 53.4	16.707
12	8 43 40.47	2.6124	22 35 18.7	11.649	12	10 40 51.51	2.2791	10 52 9.4	16.759
13	8 46 17.01	2.6056	22 23 34.9	11.809	13	10 43 8.08	2.2733	10 35 22.3	16.810
14	8 48 53.14	2.5987	22 11 41.6	11.967	14	10 45 24.31	2.2676	10 18 32.2	16.858
15	8 51 28.85	2.5916	21 59 38.8	12.124	15	10 47 40.19	2.2618	10 1 39.3	16.903
16	8 54 4.13	2.5845	21 47 26.7	12.277	16	10 49 55.73	2.2562	9 44 43.8	16.947
17	8 56 38.99	2.5775	21 35 5.5	12.428	17	10 52 10.94	2.2507	9 27 45.6	16.990
18	8 59 13.43	2.5704	21 22 35.3	12.577	18	10 54 25.82	2.2453	9 10 45.0	17.029
19	9 1 47.44	2.5632	21 9 56.2	12.725	19	10 56 40.38	2.2400	8 53 42.1	17.067
20	9 4 21.01	2.5559	20 57 8.3	12.870	20	10 58 54.62	2.2347	8 36 36.9	17.103
21	9 6 54.15	2.5487	20 44 11.8	13.012	21	11 1 8.54	2.2295	8 19 29.7	17.137
22	9 9 26.85	2.5414	20 31 6.8	13.152	22	11 3 22.16	2.2245	8 2 20.5	17.168
23	9 11 59.12	2.5342	20 17 53.5	13.290	23	11 5 35.48	2.2195	7 45 9.5	17.197
24	9 14 30.95	2.5268	N.20 4 32.0	13.426	24	11 7 48.50	2.2146	N. 7 27 56.8	17.225

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 25.					MONDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	11 7 48.50	2.2146	N. 7 27 56.8	17.225	0	12 50 13.77	2.0888	S. 6 16 14.3	16.492
1	11 10 1.23	2.2097	7 10 42.5	17.251	1	12 52 19.09	2.0885	6 32 42.3	16.440
2	11 12 13.67	2.2050	6 53 26.7	17.274	2	12 54 24.39	2.0882	6 49 7.1	16.386
3	11 14 25.83	2.2004	6 36 9.6	17.296	3	12 56 29.67	2.0879	7 5 28.6	16.331
4	11 16 37.72	2.1958	6 18 51.2	17.317	4	12 58 34.94	2.0877	7 21 46.8	16.275
5	11 18 49.34	2.1914	6 1 31.6	17.334	5	13 0 40.20	2.0877	7 38 1.6	16.217
6	11 21 0.69	2.1871	5 44 11.1	17.349	6	13 2 45.47	2.0878	7 54 12.9	16.158
7	11 23 11.78	2.1828	5 26 49.7	17.363	7	13 4 50.74	2.0879	8 10 20.6	16.099
8	11 25 22.62	2.1787	5 9 27.5	17.376	8	13 6 56.02	2.0881	8 26 24.7	16.038
9	11 27 33.22	2.1746	4 52 4.6	17.386	9	13 9 1.31	2.0883	8 42 25.2	15.976
10	11 29 43.57	2.1706	4 34 41.2	17.394	10	13 11 6.62	2.0887	8 58 21.9	15.912
11	11 31 53.69	2.1667	4 17 17.3	17.401	11	13 13 11.96	2.0892	9 14 14.7	15.847
12	11 34 3.57	2.1628	3 59 53.1	17.405	12	13 15 17.32	2.0897	9 30 3.6	15.782
13	11 36 13.23	2.1592	3 42 28.7	17.408	13	13 17 22.72	2.0902	9 45 48.5	15.714
14	11 38 22.67	2.1556	3 25 4.1	17.409	14	13 19 28.15	2.0909	10 1 29.3	15.646
15	11 40 31.90	2.1521	3 7 39.6	17.408	15	13 21 33.63	2.0917	10 17 6.0	15.577
16	11 42 40.92	2.1487	2 50 15.1	17.407	16	13 23 39.15	2.0924	10 32 38.5	15.507
17	11 44 49.74	2.1453	2 32 50.8	17.403	17	13 25 44.72	2.0933	10 48 6.8	15.435
18	11 46 58.36	2.1421	2 15 26.8	17.397	18	13 27 50.35	2.0943	11 3 30.7	15.362
19	11 49 6.79	2.1390	1 58 3.2	17.389	19	13 29 56.04	2.0953	11 18 50.2	15.287
20	11 51 15.04	2.1360	1 40 40.1	17.379	20	13 32 1.79	2.0963	11 34 5.2	15.212
21	11 53 23.11	2.1330	1 23 17.7	17.368	21	13 34 7.60	2.0975	11 49 15.7	15.137
22	11 55 31.00	2.1302	1 5 55.9	17.357	22	13 36 13.49	2.0987	12 4 21.6	15.059
23	11 57 38.73	2.1274	N. 0 48 34.9	17.343	23	13 38 19.45	2.1001	S. 12 19 22.8	14.981
	SUNDAY 26.					TUESDAY 28.			
0	11 59 46.29	2.1247	N. 0 31 14.8	17.326	0	13 40 25.50	2.1015	S. 12 34 19.3	14.901
1	12 1 53.70	2.1222	N. 0 13 55.8	17.308	1	13 42 31.63	2.1029	12 49 10.9	14.820
2	12 4 0.96	2.1197	S. 0 3 22.2	17.290	2	13 44 37.85	2.1045	13 3 57.7	14.738
3	12 6 8.07	2.1173	0 20 39.0	17.268	3	13 46 44.17	2.1061	13 18 39.5	14.655
4	12 8 15.04	2.1151	0 37 54.4	17.246	4	13 48 50.58	2.1077	13 33 16.3	14.571
5	12 10 21.88	2.1129	0 55 8.5	17.222	5	13 50 57.09	2.1093	13 47 48.0	14.487
6	12 12 28.59	2.1108	1 12 21.1	17.197	6	13 53 3.70	2.1111	14 2 14.6	14.401
7	12 14 35.18	2.1088	1 29 32.1	17.170	7	13 55 10.42	2.1129	14 16 36.1	14.313
8	12 16 41.65	2.1069	1 46 41.5	17.142	8	13 57 17.25	2.1147	14 30 52.3	14.225
9	12 18 48.01	2.1052	2 3 49.2	17.112	9	13 59 24.19	2.1167	14 45 3.1	14.136
10	12 20 54.27	2.1034	2 20 55.0	17.081	10	14 1 31.25	2.1187	14 59 8.6	14.046
11	12 23 0.42	2.1017	2 37 58.9	17.047	11	14 3 38.43	2.1207	15 13 8.6	13.955
12	12 25 6.48	2.1002	2 55 0.7	17.012	12	14 5 45.74	2.1228	15 27 3.2	13.862
13	12 27 12.45	2.0988	3 12 0.4	16.977	13	14 7 53.17	2.1249	15 40 52.2	13.769
14	12 29 18.34	2.0975	3 28 58.0	16.941	14	14 10 0.73	2.1272	15 54 35.5	13.675
15	12 31 24.15	2.0962	3 45 53.3	16.902	15	14 12 8.43	2.1294	16 8 13.1	13.579
16	12 33 29.88	2.0949	4 2 46.2	16.861	16	14 14 16.26	2.1317	16 21 45.0	13.483
17	12 35 35.54	2.0939	4 19 36.6	16.819	17	14 16 24.23	2.1340	16 35 11.1	13.386
18	12 37 41.15	2.0930	4 36 24.5	16.777	18	14 18 32.34	2.1364	16 48 31.3	13.287
19	12 39 46.70	2.0921	4 53 9.8	16.733	19	14 20 40.60	2.1388	17 1 45.6	13.188
20	12 41 52.20	2.0912	5 9 52.4	16.687	20	14 22 49.00	2.1413	17 14 53.9	13.088
21	12 43 57.65	2.0905	5 26 32.3	16.640	21	14 24 57.56	2.1439	17 27 56.2	12.987
22	12 46 3.06	2.0898	5 43 9.3	16.592	22	14 27 6.27	2.1464	17 40 52.4	12.885
23	12 48 8.43	2.0892	5 59 43.3	16.542	23	14 29 15.13	2.1490	17 53 42.4	12.782
24	12 50 13.77	2.0888	S. 6 16 14.3	16.492	24	14 31 24.15	2.1517	S. 18 6 26.2	12.677

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

WEDNESDAY 29.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	14 31 24.15	2.1517	S.18 6 26.2	12.677
1	14 33 33.33	2.1543	18 19 3.7	12.572
2	14 35 42.67	2.1570	18 31 34.9	12.467
3	14 37 52.17	2.1597	18 43 59.8	12.361
4	14 40 1.84	2.1625	18 56 18.2	12.252
5	14 42 11.67	2.1652	19 8 30.1	12.144
6	14 44 21.67	2.1681	19 20 35.5	12.034
7	14 46 31.84	2.1710	19 32 34.2	11.923
8	14 48 42.19	2.1739	19 44 26.3	11.812
9	14 50 52.71	2.1767	19 56 11.7	11.700
10	14 53 3.40	2.1797	20 7 50.3	11.587
11	14 55 14.27	2.1826	20 19 22.1	11.472
12	14 57 25.31	2.1855	20 30 47.0	11.357
13	14 59 36.53	2.1885	20 42 5.0	11.242
14	15 1 47.93	2.1915	20 53 16.1	11.126
15	15 3 59.51	2.1945	21 4 20.1	11.008
16	15 6 11.27	2.1975	21 15 17.1	10.890
17	15 8 23.21	2.2006	21 26 6.9	10.771
18	15 10 35.34	2.2036	21 36 49.6	10.651
19	15 12 47.64	2.2066	21 47 25.0	10.530
20	15 15 0.13	2.2097	21 57 53.2	10.408
21	15 17 12.80	2.2127	22 8 14.0	10.286
22	15 19 25.65	2.2157	22 18 27.5	10.162
23	15 21 38.69	2.2188	S.22 28 33.5	10.038

THURSDAY 30.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	15 23 51.91	2.2218	S.22 38 32.1	9.914
1	15 26 5.31	2.2248	22 48 23.2	9.788
2	15 28 18.89	2.2279	22 58 6.7	9.662
3	15 30 32.66	2.2310	23 7 42.6	9.535
4	15 32 46.61	2.2339	23 17 10.9	9.407
5	15 35 0.73	2.2368	23 26 31.5	9.278
6	15 37 15.03	2.2398	23 35 44.3	9.148
7	15 39 29.51	2.2428	23 44 49.3	9.018
8	15 41 44.17	2.2457	23 53 46.5	8.888
9	15 43 59.00	2.2487	24 2 35.9	8.757
10	15 46 14.01	2.2516	24 11 17.3	8.624
11	15 48 29.19	2.2545	24 19 50.8	8.492
12	15 50 44.55	2.2573	24 28 16.3	8.357
13	15 53 0.07	2.2602	24 36 33.7	8.223
14	15 55 15.77	2.2630	24 44 43.1	8.089
15	15 57 31.63	2.2657	24 52 44.4	7.953
16	15 59 47.65	2.2684	25 0 37.5	7.817
17	16 2 3.84	2.2711	25 8 22.5	7.681
18	16 4 20.18	2.2737	25 15 59.2	7.543
19	16 6 36.69	2.2764	25 23 27.6	7.405
20	16 8 53.35	2.2789	25 30 47.8	7.267
21	16 11 10.16	2.2814	25 37 59.6	7.127
22	16 13 27.12	2.2838	25 45 3.1	6.988
23	16 15 44.22	2.2862	25 51 58.2	6.847
24	16 18 1.47	2.2887	S.25 58 44.8	6.707

FRIDAY 31.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	16 18 1.47	2.2887	S.25 58 44.8	6.707
1	16 20 18.86	2.2910	26 5 23.0	6.566
2	16 22 36.39	2.2933	26 11 52.7	6.423
3	16 24 54.06	2.2955	26 18 13.8	6.281
4	16 27 11.85	2.2977	26 24 26.4	6.138
5	16 29 29.78	2.2998	26 30 30.4	5.995
6	16 31 47.83	2.3018	26 36 25.8	5.852
7	16 34 6.00	2.3037	26 42 12.6	5.708
8	16 36 24.28	2.3057	26 47 50.8	5.563
9	16 38 42.68	2.3076	26 53 20.2	5.417
10	16 41 1.19	2.3093	26 58 40.9	5.272
11	16 43 19.80	2.3111	27 3 52.9	5.127
12	16 45 38.52	2.3128	27 8 56.2	4.982
13	16 47 57.34	2.3144	27 13 50.7	4.835
14	16 50 16.25	2.3158	27 18 36.4	4.687
15	16 52 35.24	2.3172	27 23 13.2	4.540
16	16 54 54.31	2.3186	27 27 41.2	4.393
17	16 57 13.47	2.3199	27 32 0.4	4.246
18	16 59 32.70	2.3211	27 36 10.7	4.097
19	17 1 52.00	2.3222	27 40 12.1	3.949
20	17 4 11.36	2.3232	27 44 4.6	3.801
21	17 6 30.79	2.3242	27 47 48.2	3.652
22	17 8 50.27	2.3251	27 51 22.9	3.503
23	17 11 9.80	2.3258	S.27 54 48.6	3.354

SATURDAY, FEB. 1.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	17 13 29.37	2.3265	S.27 58 5.4	3.205

PHASES OF THE MOON.

			d	h	m
●	New Moon . . .	Jan.	6	22	28.3
☽	First Quarter		15	4	1.6
○	Full Moon		22	3	40.1
☾	Last Quarter		28	19	34.0

			d	h
☾	Apogee	Jan.	10	12.5
☾	Perigee		22	23.4

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Sat.	1	20 58 6.64	10.202	S. 17 11 11.3	+42.49	16 15.63	68.28	13 43.94	0.346
SUN.	2	21 2 11.10	10.169	16 54 2.5	43.24	16 15.48	68.16	13 51.82	0.312
Mon.	3	21 6 14.74	10.135	16 36 35.8	43.98	16 15.32	68.04	13 58.89	0.278
Tues.	4	21 10 17.57	10.102	16 18 51.7	+44.69	16 15.16	67.93	14 5.15	0.244
Wed.	5	21 14 19.59	10.068	16 0 50.6	45.39	16 15.00	67.81	14 10.60	0.210
Thur.	6	21 18 20.80	10.034	15 42 33.0	46.07	16 14.84	67.70	14 15.23	0.176
Fri.	7	21 22 21.19	10.000	15 23 59.3	+46.73	16 14.67	67.58	14 19.06	0.143
Sat.	8	21 26 20.77	9.966	15 5 9.9	47.38	16 14.50	67.47	14 22.08	0.109
SUN.	9	21 30 19.55	9.932	14 46 5.3	48.00	16 14.32	67.35	14 24.29	0.076
Mon.	10	21 34 17.52	9.899	14 26 45.8	+48.60	16 14.14	67.24	14 25.70	0.043
Tues.	11	21 38 14.70	9.866	14 7 12.0	49.19	16 13.97	67.13	14 26.32	0.010
Wed.	12	21 42 11.09	9.834	13 47 24.3	49.76	16 13.79	67.02	14 26.15	0.023
Thur.	13	21 46 6.70	9.801	13 27 23.1	+50.31	16 13.60	66.91	14 25.21	0.055
Fri.	14	21 50 1.54	9.769	13 7 8.8	50.84	16 13.41	66.81	14 23.50	0.088
Sat.	15	21 53 55.61	9.737	12 46 41.9	51.36	16 13.22	66.71	14 21.02	0.120
SUN.	16	21 57 48.92	9.706	12 26 2.9	+51.86	16 13.02	66.61	14 17.79	0.150
Mon.	17	22 1 41.50	9.676	12 5 12.1	52.35	16 12.82	66.51	14 13.82	0.180
Tues.	18	22 5 33.37	9.646	11 44 9.9	52.82	16 12.61	66.41	14 9.15	0.209
Wed.	19	22 9 24.53	9.617	11 22 56.7	+53.27	16 12.40	66.31	14 3.78	0.238
Thur.	20	22 13 14.99	9.589	11 1 32.8	53.71	16 12.19	66.21	13 57.72	0.265
Fri.	21	22 17 4.79	9.562	10 39 58.7	54.12	16 11.98	66.11	13 50.98	0.292
Sat.	22	22 20 53.95	9.535	10 18 14.8	+54.52	16 11.76	66.02	13 43.59	0.319
SUN.	23	22 24 42.48	9.510	9 56 21.4	54.91	16 11.53	65.93	13 35.58	0.346
Mon.	24	22 28 30.40	9.485	9 34 18.9	55.29	16 11.30	65.84	13 26.97	0.371
Tues.	25	22 32 17.73	9.461	9 12 7.7	+55.65	16 11.06	65.75	13 17.78	0.395
Wed.	26	22 36 4.49	9.437	8 49 48.1	55.98	16 10.82	65.67	13 8.02	0.418
Thur.	27	22 39 50.70	9.415	8 27 20.6	56.30	16 10.57	65.59	12 57.70	0.441
Fri.	28	22 43 36.37	9.393	8 4 45.5	56.61	16 10.33	65.51	12 46.84	0.463
Sat.	29	22 47 21.54	9.372	S. 7 42 3.2	+56.90	16 10.08	65.43	12 35.48	0.484

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0ˢ.18 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time. or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Sat.	1	20 58 4.30	10.202	S. 17 11 20.9	+42.48	13 43.86	0.346	20 44 20.43
SUN.	2	21 2 8.74	10.168	16 54 12.3	43.23	13 51.75	0.312	20 48 16.99
Mon.	3	21 6 12.38	10.134	16 36 45.9	43.97	13 58.83	0.278	20 52 13.55
Tues.	4	21 10 15.20	10.101	16 19 2.1	+44.68	14 5.10	0.244	20 56 10.10
Wed.	5	21 14 17.21	10.067	16 1 1.3	45.38	14 10.55	0.210	21 0 6.66
Thur.	6	21 18 18.41	10.033	15 42 43.9	46.06	14 15.19	0.176	21 4 3.22
Fri.	7	21 22 18.80	9.999	15 24 10.4	+46.72	14 19.03	0.143	21 7 59.77
Sat.	8	21 26 18.38	9.966	15 5 21.2	47.37	14 22.06	0.109	21 11 56.33
SUN.	9	21 30 17.16	9.932	14 46 16.8	47.99	14 24.28	0.076	21 15 52.88
Mon.	10	21 34 15.14	9.899	14 26 57.5	+48.60	14 25.70	0.043	21 19 49.44
Tues.	11	21 38 12.32	9.866	14 7 23.9	49.19	14 26.32	0.010	21 23 46.00
Wed.	12	21 42 8.71	9.834	13 47 36.3	49.76	14 26.16	0.023	21 27 42.55
Thur.	13	21 46 4.33	9.801	13 27 35.2	+50.32	14 25.23	0.055	21 31 39.11
Fri.	14	21 49 59.18	9.769	13 7 21.1	50.85	14 23.52	0.087	21 35 35.66
Sat.	15	21 53 53.27	9.738	12 46 54.3	51.37	14 21.05	0.119	21 39 32.22
SUN.	16	21 57 46.61	9.707	12 26 15.3	+51.87	14 17.83	0.149	21 43 28.77
Mon.	17	22 1 39.21	9.677	12 5 24.5	52.35	14 13.88	0.179	21 47 25.33
Tues.	18	22 5 31.09	9.647	11 44 22.3	52.82	14 9.21	0.209	21 51 21.88
Wed.	19	22 9 22.27	9.618	11 23 9.1	+53.27	14 3.83	0.238	21 55 18.44
Thur.	20	22 13 12.76	9.590	11 1 45.3	53.71	13 57.76	0.265	21 59 14.99
Fri.	21	22 17 2.58	9.563	10 40 11.2	54.12	13 51.03	0.292	22 3 11.55
Sat.	22	22 20 51.76	9.536	10 18 27.3	+54.52	13 43.66	0.319	22 7 8.10
SUN.	23	22 24 40.32	9.511	9 56 33.9	54.91	13 35.66	0.346	22 11 4.66
Mon.	24	22 28 28.27	9.486	9 34 31.3	55.29	13 27.05	0.371	22 15 1.21
Tues.	25	22 32 15.63	9.462	9 12 20.0	+55.65	13 17.86	0.395	22 18 57.77
Wed.	26	22 36 2.42	9.438	8 50 0.4	55.99	13 8.10	0.418	22 22 54.32
Thur.	27	22 39 48.66	9.416	8 27 32.8	56.31	12 57.79	0.441	22 26 50.88
Fri.	28	22 43 34.37	9.394	8 4 57.6	56.62	12 46.94	0.463	22 30 47.43
Sat.	29	22 47 19.57	9.373	S. 7 42 15.2	+56.91	12 35.58	0.484	22 34 43.98

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 Hour.
$+9^{s}.8565$.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	The Sun's True Longitude. λ	The Sun's True Longitude. λ′	The Sun's Diff. for 1 Hour.	The Sun's Latitude.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		° ′ ″	′ ″	″	″			h m s
1	32	312 3 31.0	3 27.1	152.24	−0.58	9.993 6655	+28.0	3 15 7.51
2	33	313 4 24.3	4 20.3	152.20	0.61	9.993 7335	28.7	3 11 11.60
3	34	314 5 16.7	5 12.5	152.16	0.61	9.993 8030	29.3	3 7 15.69
4	35	315 6 8.1	6 3.7	152.12	−0.57	9.993 8739	+29.8	3 3 19.78
5	36	316 6 58.4	6 53.8	152.07	0.51	9.993 9462	30.3	2 59 23.87
6	37	317 7 47.5	7 42.8	152.02	0.43	9.994 0198	30.9	2 55 27.96
7	38	318 8 35.3	8 30.5	151.97	−0.33	9.994 0946	+31.4	2 51 32.05
8	39	319 9 21.8	9 16.8	151.91	0.22	9.994 1707	32.0	2 47 36.14
9	40	320 10 6.8	10 1.7	151.85	−0.10	9.994 2480	32.5	2 43 40.23
10	41	321 10 50.4	10 45.1	151.78	+0.03	9.994 3267	+33.1	2 39 44.32
11	42	322 11 32.4	11 27.0	151.72	0.15	9.994 4067	33.6	2 35 48.41
12	43	323 12 12.8	12 7.3	151.65	0.27	9.994 4880	34.2	2 31 52.50
13	44	324 12 51.5	12 45.8	151.58	+0.37	9.994 5708	+34.8	2 27 56.59
14	45	325 13 28.5	13 22.6	151.50	0.45	9.994 6551	35.5	2 24 0.68
15	46	326 14 3.7	13 57.7	151.43	0.51	9.994 7410	36.2	2 20 4.77
16	47	327 14 37.1	14 31.0	151.35	+0.53	9.994 8287	+36.9	2 16 8.86
17	48	328 15 8.7	15 2.4	151.28	0.53	9.994 9182	37.6	2 12 12.95
18	49	329 15 38.5	15 32.1	151.21	0.50	9.995 0096	38.4	2 8 17.04
19	50	330 16 6.5	16 0.0	151.13	+0.43	9.995 1030	+39.2	2 4 21.13
20	51	331 16 32.8	16 26.2	151.06	0.33	9.995 1985	40.1	2 0 25.22
21	52	332 16 57.4	16 50.7	150.99	0.21	9.995 2962	41.0	1 56 29.32
22	53	333 17 20.4	17 13.6	150.93	+0.08	9.995 3959	+41.9	1 52 33.41
23	54	334 17 41.9	17 34.9	150.87	−0.06	9.995 4976	42.7	1 48 37.50
24	55	335 18 1.9	17 54.8	150.81	0.19	9.995 6012	43.5	1 44 41.59
25	56	336 18 20.4	18 13.2	150.75	−0.32	9.995 7065	+44.2	1 40 45.68
26	57	337 18 37.5	18 30.1	150.68	0.43	9.995 8134	44.8	1 36 49.77
27	58	338 18 53.1	18 45.6	150.62	0.51	9.995 9217	45.4	1 32 53.86
28	59	339 19 7.2	18 59.5	150.56	0.58	9.996 0313	45.9	1 28 57.96
29	60	340 19 19.8	19 12.0	150.50	−0.60	9.996 1419	+46.3	1 25 2.05

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ′ are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
−9s.8296.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 7.2	15 3.1	55 23.73	−1.317	55 8.73	−1.184	21 15.1	2.24	25.1
2	14 59.5	14 56.2	54 55.29	1.055	54 43.36	0.933	22 8.1	2.17	26.1
3	14 53.4	14 50.9	54 32.88	0.814	54 23.79	0.701	22 59.0	2.06	27.1
4	14 48.8	14 47.0	54 16.03	−0.592	54 9.56	−0.488	23 46.9	1.93	28.1
5	14 45.6	14 44.5	54 4.33	0.384	54 0.34	0.280	6	. .	29.1
6	14 43.8	14 43.4	53 57.61	−0.175	53 56.14	−0.071	0 31.7	1.81	0.3
7	14 43.3	14 43.6	53 55.94	+0.039	53 57.10	+0.155	1 13.8	1.71	1.3
8	14 44.3	14 45.4	53 59.69	0.278	54 3.80	0.407	1 53.9	1.64	2.3
9	14 47.0	14 49.0	54 9.50	0.545	54 16.90	0.691	2 33.0	1.62	3.3
10	14 51.5	14 54.6	54 26.10	+0.844	54 37.19	+1.005	3 12.1	1.64	4.3
11	14 58.1	15 2.2	54 50.24	1.172	55 5.33	1.344	3 52.3	1.72	5.3
12	15 6.9	15 12.2	55 22.48	1.515	55 41.70	1.686	4 34.9	1.84	6.3
13	15 17.9	15 24.2	56 2.92	+1.849	56 26.04	+2.002	5 21.0	2.01	7.3
14	15 31.0	15 38.2	56 50.93	2.142	57 17.36	2.257	6 11.9	2.23	8.3
15	15 45.7	15 53.5	57 44.99	2.342	58 13.41	2.390	7 8.0	2.44	9.3
16	16 1.3	16 9.1	58 42.19	+2.399	59 10.76	+2.354	8 8.9	2.61	10.3
17	16 16.6	16 23.8	59 38.45	2.253	60 4.55	2.089	9 12.5	2.66	11.3
18	16 30.2	16 35.9	60 28.31	1.864	60 49.02	1.579	10 16.0	2.60	12.3
19	16 40.5	16 43.9	61 5.97	+1.239	61 18.55	+0.853	11 16.9	2.46	13.3
20	16 46.0	16 46.8	61 26.32	+0.437	61 28.96	+0.002	12 13.9	2.30	14.3
21	16 46.1	16 43.9	61 26.35	−0.436	61 18.58	−0.856	13 7.4	2.17	15.3
22	16 40.5	16 35.8	61 5.95	−1.243	60 48.93	−1.588	13 58.4	2.09	16.3
23	16 30.2	16 23.6	60 28.07	1.879	60 4.08	2.109	14 48.2	2.07	17.3
24	16 16.4	16 8.8	59 37.71	2.276	59 9.71	2.382	15 38.2	2.10	18.3
25	16 0.9	15 53.0	58 40.77	−2.432	58 11.57	−2.427	16 29.2	2.16	19.3
26	15 45.1	15 37.5	57 42.71	2.377	57 14.67	2.290	17 21.8	2.22	20.3
27	15 30.2	15 23.3	56 47.86	2.173	56 22.61	2.031	18 15.8	2.27	21.3
28	15 16.9	15 11.0	55 59.17	−1.872	55 37.71	−1.700	19 10.4	2.27	22.3
29	15 5.7	15 1.1	55 18.37	1.522	55 1.18	1.342	20 4.1	2.20	23.3
30	14 57.0	14 53.5	54 46.16	1.162	54 33.27	0.986	20 55.7	2.09	24.3
31	14 50.5	14 48.2	54 22.47	0.816	54 13.67	0.652	21 44.4	1.97	25.3
32	14 46.3	14 44.9	54 6.78	−0.498	54 1.68	−0.353	22 30.0	1.84	26.3

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 1.					MONDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	17 13 29.37	2.3265	S. 27 58 5.4	3.205	0	19 4 14.98	2.2538	S. 27 41 22.9	3.790
1	17 15 48.98	2.3272	28 1 13.2	3.056	1	19 6 30.10	2.2502	27 37 31.4	3.926
2	17 18 8.63	2.3277	28 4 12.1	2.907	2	19 8 45.01	2.2466	27 33 31.8	4.060
3	17 20 28.31	2.3282	28 7 2.0	2.757	3	19 10 59.69	2.2428	27 29 24.2	4.193
4	17 22 48.02	2.3286	28 9 42.9	2.607	4	19 13 14.15	2.2391	27 25 8.6	4.327
5	17 25 7.74	2.3288	28 12 14.9	2.458	5	19 15 28.38	2.2352	27 20 45.0	4.459
6	17 27 27.48	2.3290	28 14 37.9	2.308	6	19 17 42.38	2.2313	27 16 13.5	4.591
7	17 29 47.22	2.3291	28 16 51.9	2.158	7	19 19 56.14	2.2273	27 11 34.1	4.722
8	17 32 6.97	2.3291	28 18 56.9	2.008	8	19 22 9.66	2.2233	27 6 46.9	4.852
9	17 34 26.71	2.3290	28 20 52.9	1.858	9	19 24 22.94	2.2192	27 1 51.9	4.982
10	17 36 46.45	2.3288	28 22 39.9	1.708	10	19 26 35.97	2.2150	26 56 49.1	5.110
11	17 39 6.17	2.3285	28 24 17.9	1.558	11	19 28 48.74	2.2108	26 51 38.7	5.237
12	17 41 25.87	2.3281	28 25 46.9	1.408	12	19 31 1.27	2.2067	26 46 20.7	5.364
13	17 43 45.54	2.3277	28 27 6.9	1.259	13	19 33 13.54	2.2023	26 40 55.0	5.491
14	17 46 5.19	2.3272	28 28 18.0	1.110	14	19 35 25.55	2.1980	26 35 21.8	5.616
15	17 48 24.80	2.3265	28 29 20.1	0.960	15	19 37 37.30	2.1936	26 29 41.1	5.740
16	17 50 44.37	2.3257	28 30 13.2	0.811	16	19 39 48.78	2.1892	26 23 53.0	5.864
17	17 53 3.88	2.3248	28 30 57.4	0.662	17	19 42 0.00	2.1848	26 17 57.4	5.987
18	17 55 23.34	2.3239	28 31 32.7	0.513	18	19 44 10.95	2.1802	26 11 54.5	6.108
19	17 57 42.75	2.3229	28 31 59.0	0.364	19	19 46 21.62	2.1756	26 5 44.4	6.229
20	18 0 2.09	2.3218	28 32 16.4	0.216	20	19 48 32.02	2.1710	25 59 27.0	6.350
21	18 2 21.36	2.3205	28 32 24.9	−0.067	21	19 50 42.14	2.1663	25 53 2.4	6.470
22	18 4 40.55	2.3192	28 32 24.5	+0.081	22	19 52 51.98	2.1617	25 46 30.6	6.589
23	18 6 59.66	2.3178	S. 28 32 15.2	0.228	23	19 55 1.54	2.1570	S. 25 39 51.7	6.706
	SUNDAY 2.					TUESDAY 4.			
0	18 9 18.68	2.3163	S. 28 31 57.1	0.376	0	19 57 10.82	2.1522	S. 25 33 5.9	6.822
1	18 11 37.61	2.3147	28 31 30.1	0.523	1	19 59 19.81	2.1475	25 26 13.1	6.938
2	18 13 56.44	2.3130	28 30 54.3	0.670	2	20 1 28.52	2.1427	25 19 13.3	7.053
3	18 16 15.17	2.3112	28 30 9.7	0.817	3	20 3 36.94	2.1378	25 12 6.7	7.167
4	18 18 33.78	2.3092	28 29 16.3	0.963	4	20 5 45.06	2.1330	25 4 53.3	7.280
5	18 20 52.28	2.3073	28 28 14.1	1.109	5	20 7 52.90	2.1282	24 57 33.1	7.392
6	18 23 10.66	2.3053	28 27 3.2	1.254	6	20 10 0.44	2.1232	24 50 6.2	7.503
7	18 25 28.92	2.3032	28 25 43.6	1.399	7	20 12 7.69	2.1184	24 42 32.7	7.613
8	18 27 47.05	2.3010	28 24 15.3	1.544	8	20 14 14.65	2.1135	24 34 52.6	7.723
9	18 30 5.04	2.2986	28 22 38.3	1.689	9	20 16 21.31	2.1085	24 27 5.9	7.832
10	18 32 22.88	2.2961	28 20 52.6	1.833	10	20 18 27.67	2.1036	24 19 12.8	7.938
11	18 34 40.57	2.2937	28 18 58.3	1.976	11	20 20 33.74	2.0986	24 11 13.3	8.045
12	18 36 58.12	2.2912	28 16 55.5	2.118	12	20 22 39.50	2.0935	24 3 7.4	8.151
13	18 39 15.51	2.2884	28 14 44.1	2.262	13	20 24 44.96	2.0886	23 54 55.2	8.255
14	18 41 32.73	2.2857	28 12 24.1	2.403	14	20 26 50.13	2.0837	23 46 36.8	8.358
15	18 43 49.79	2.2829	28 9 55.7	2.544	15	20 28 55.00	2.0787	23 38 12.2	8.462
16	18 46 6.68	2.2799	28 7 18.8	2.686	16	20 30 59.57	2.0737	23 29 41.4	8.563
17	18 48 23.38	2.2769	28 4 33.4	2.826	17	20 33 3.84	2.0687	23 21 4.6	8.663
18	18 50 39.91	2.2739	28 1 39.7	2.965	18	20 35 7.81	2.0637	23 12 21.8	8.762
19	18 52 56.25	2.2707	27 58 37.6	3.105	19	20 37 11.48	2.0587	23 3 33.1	8.862
20	18 55 12.39	2.2674	27 55 27.1	3.243	20	20 39 14.85	2.0537	22 54 38.4	8.960
21	18 57 28.34	2.2642	27 52 8.4	3.381	21	20 41 17.92	2.0487	22 45 37.9	9.057
22	18 59 44.09	2.2608	27 48 41.4	3.518	22	20 43 20.69	2.0437	22 36 31.6	9.152
23	19 1 59.64	2.2573	27 45 6.2	3.654	23	20 45 23.16	2.0387	22 27 19.6	9.247
24	19 4 14.98	2.2538	S. 27 41 22.9	3.790	24	20 47 25.34	2.0337	S. 22 18 1.9	9.342

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 5.					FRIDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	20 47 25.34	2.0337	S. 22 18 1.9	9.342	0	22 19 45.87	1.8278	S. 13 19 38.0	12.737
1	20 49 27.21	2.0287	22 8 38.6	9.434	1	22 21 35.44	1.8247	13 6 52.3	12.785
2	20 51 28.79	2.0238	21 59 9.8	9.526	2	22 23 24.83	1.8215	12 54 3.8	12.833
3	20 53 30.07	2.0189	21 49 35.5	9.617	3	22 25 14.02	1.8183	12 41 12.4	12.880
4	20 55 31.06	2.0140	21 39 55.8	9.707	4	22 27 3.03	1.8153	12 28 18.2	12.926
5	20 57 31.75	2.0091	21 30 10.7	9.796	5	22 28 51.86	1.8123	12 15 21.3	12.971
6	20 59 32.15	2.0042	21 20 20.3	9.884	6	22 30 40.51	1.8094	12 2 21.7	13.016
7	21 1 32.25	1.9992	21 10 24.6	9.972	7	22 32 28.99	1.8065	11 49 19.4	13.060
8	21 3 32.06	1.9944	21 0 23.7	10.058	8	22 34 17.29	1.8037	11 36 14.5	13.103
9	21 5 31.58	1.9896	20 50 17.7	10.143	9	22 36 5.43	1.8009	11 23 7.0	13.146
10	21 7 30.81	1.9847	20 40 6.6	10.227	10	22 37 53.40	1.7982	11 9 57.0	13.187
11	21 9 29.75	1.9799	20 29 50.5	10.310	11	22 39 41.21	1.7956	10 56 44.6	13.227
12	21 11 28.40	1.9752	20 19 29.4	10.393	12	22 41 28.87	1.7930	10 43 29.8	13.267
13	21 13 26.77	1.9705	20 9 3.4	10.474	13	22 43 16.37	1.7904	10 30 12.6	13.305
14	21 15 24.86	1.9658	19 58 32.5	10.554	14	22 45 3.72	1.7879	10 16 53.2	13.343
15	21 17 22.66	1.9610	19 47 56.9	10.633	15	22 46 50.92	1.7855	10 3 31.5	13.381
16	21 19 20.18	1.9563	19 37 16.5	10.712	16	22 48 37.98	1.7832	9 50 7.5	13.417
17	21 21 17.42	1.9518	19 26 31.4	10.789	17	22 50 24.90	1.7809	9 36 41.4	13.452
18	21 23 14.39	1.9472	19 15 41.7	10.866	18	22 52 11.69	1.7787	9 23 13.2	13.487
19	21 25 11.08	1.9426	19 4 47.5	10.942	19	22 53 58.34	1.7765	9 9 42.9	13.522
20	21 27 7.50	1.9381	18 53 48.8	11.016	20	22 55 44.87	1.7744	8 56 10.5	13.556
21	21 29 3.65	1.9336	18 42 45.6	11.090	21	22 57 31.27	1.7724	8 42 36.2	13.588
22	21 30 59.53	1.9291	18 31 38.0	11.163	22	22 59 17.56	1.7705	8 29 0.0	13.619
23	21 32 55.14	1.9246	S. 18 20 26.0	11.235	23	23 1 3.73	1.7685	S. 8 15 21.9	13.651
	THURSDAY 6.					SATURDAY 8.			
0	21 34 50.48	1.9202	S. 18 9 9.8	11.306	0	23 2 49.78	1.7667	S. 8 1 41.9	13.682
1	21 36 45.56	1.9158	17 57 49.3	11.376	1	23 4 35.73	1.7649	7 48 0.1	13.711
2	21 38 40.38	1.9116	17 46 24.7	11.445	2	23 6 21.57	1.7632	7 34 16.6	13.738
3	21 40 34.95	1.9073	17 34 55.9	11.513	3	23 8 7.31	1.7615	7 20 31.5	13.767
4	21 42 29.26	1.9030	17 23 23.1	11.580	4	23 9 52.95	1.7599	7 6 44.6	13.795
5	21 44 23.31	1.8988	17 11 46.3	11.647	5	23 11 38.50	1.7584	6 52 56.1	13.821
6	21 46 17.12	1.8947	17 0 5.5	11.712	6	23 13 23.96	1.7569	6 39 6.1	13.847
7	21 48 10.68	1.8906	16 48 20.9	11.776	7	23 15 9.33	1.7555	6 25 14.5	13.872
8	21 50 3.99	1.8865	16 36 32.4	11.840	8	23 16 54.62	1.7542	6 11 21.5	13.896
9	21 51 57.06	1.8825	16 24 40.1	11.902	9	23 18 39.83	1.7529	5 57 27.0	13.920
10	21 53 49.89	1.8785	16 12 44.1	11.964	10	23 20 24.97	1.7517	5 43 31.1	13.943
11	21 55 42.48	1.8745	16 0 44.4	12.025	11	23 22 10.04	1.7507	5 29 33.9	13.964
12	21 57 34.83	1.8706	15 48 41.1	12.085	12	23 23 55.05	1.7496	5 15 35.4	13.986
13	21 59 26.95	1.8668	15 36 34.2	12.144	13	23 25 39.99	1.7486	5 1 35.6	14.007
14	22 1 18.85	1.8631	15 24 23.8	12.202	14	23 27 24.88	1.7477	4 47 34.6	14.027
15	22 3 10.52	1.8593	15 12 10.0	12.259	15	23 29 9.72	1.7468	4 33 32.4	14.046
16	22 5 1.97	1.8557	14 59 52.7	12.316	16	23 30 54.50	1.7460	4 19 29.1	14.064
17	22 6 53.20	1.8520	14 47 32.1	12.371	17	23 32 39.24	1.7453	4 5 24.7	14.082
18	22 8 44.21	1.8483	14 35 8.2	12.426	18	23 34 23.94	1.7447	3 51 19.3	14.098
19	22 10 35.00	1.8447	14 22 41.0	12.480	19	23 36 8.60	1.7441	3 37 12.9	14.115
20	22 12 25.58	1.8413	14 10 10.6	12.533	20	23 37 53.23	1.7437	3 23 5.5	14.130
21	22 14 15.96	1.8379	13 57 37.0	12.585	21	23 39 37.84	1.7432	3 8 57.3	14.144
22	22 16 6.13	1.8345	13 45 0.4	12.636	22	23 41 22.42	1.7428	2 54 48.2	14.159
23	22 17 56.10	1.8312	13 32 20.7	12.687	23	23 43 6.98	1.7425	2 40 38.2	14.173
24	22 19 45.87	1.8278	S. 13 19 38.0	12.737	24	23 44 51.52	1.7423	S. 2 26 27.5	14.185

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 9.					TUESDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	23 44 51.52	1.7423	S. 2 26 27.5	14.185	0	1 9 37.33	1.8187	N. 8 55 1.5	13.921
1	23 46 36.05	1.7422	2 12 16.0	14.197	1	1 11 26.55	1.8222	9 8 56.0	13.896
2	23 48 20.58	1.7421	1 58 3.9	14.207	2	1 13 15.99	1.8257	9 22 49.0	13.871
3	23 50 5.10	1.7420	1 43 51.1	14.218	3	1 15 5.64	1.8294	9 36 40.5	13.845
4	23 51 49.62	1.7421	1 29 37.7	14.228	4	1 16 55.52	1.8332	9 50 30.4	13.818
5	23 53 34.15	1.7423	1 15 23.8	14.236	5	1 18 45.62	1.8369	10 4 18.6	13.789
6	23 55 18.69	1.7424	1 1 9.4	14.244	6	1 20 35.95	1.8408	10 18 5.1	13.760
7	23 57 3.24	1.7427	0 46 54.5	14.252	7	1 22 26.52	1.8448	10 31 49.8	13.730
8	23 58 47.81	1.7430	0 32 39.1	14.259	8	1 24 17.33	1.8489	10 45 32.7	13.699
9	0 0 32.40	1.7435	0 18 23.4	14.265	9	1 26 8.39	1.8531	10 59 13.7	13.667
10	0 2 17.03	1.7440	S. 0 4 7.3	14.271	10	1 27 59.70	1.8573	11 12 52.8	13.635
11	0 4 1.68	1.7445	N. 0 10 9.1	14.275	11	1 29 51.26	1.8615	11 26 29.9	13.601
12	0 5 46.37	1.7452	0 24 25.7	14.278	12	1 31 43.08	1.8659	11 40 4.9	13.566
13	0 7 31.10	1.7458	0 38 42.5	14.282	13	1 33 35.17	1.8703	11 53 37.8	13.532
14	0 9 15.87	1.7467	0 52 59.6	14.286	14	1 35 27.52	1.8748	12 7 8.7	13.496
15	0 11 0.70	1.7476	1 7 16.8	14.287	15	1 37 20.15	1.8795	12 20 37.3	13.458
16	0 12 45.58	1.7484	1 21 34.0	14.288	16	1 39 13.06	1.8842	12 34 3.6	13.419
17	0 14 30.51	1.7494	1 35 51.3	14.288	17	1 41 6.26	1.8890	12 47 27.6	13.380
18	0 16 15.51	1.7506	1 50 8.6	14.287	18	1 42 59.74	1.8938	13 0 49.2	13.340
19	0 18 0.58	1.7518	2 4 25.8	14.286	19	1 44 53.52	1.8988	13 14 8.4	13.299
20	0 19 45.72	1.7529	2 18 42.9	14.284	20	1 46 47.60	1.9038	13 27 25.1	13.257
21	0 21 30.93	1.7542	2 32 59.9	14.282	21	1 48 41.98	1.9089	13 40 39.2	13.213
22	0 23 16.23	1.7557	2 47 16.7	14.278	22	1 50 36.67	1.9142	13 53 50.7	13.169
23	0 25 1.61	1.7571	N. 3 1 33.3	14.274	23	1 52 31.68	1.9194	N. 14 6 59.5	13.123
	MONDAY 10.					WEDNESDAY 12.			
0	0 26 47.08	1.7586	N. 3 15 49.6	14.269	0	1 54 27.00	1.9247	N. 14 20 5.5	13.077
1	0 28 32.64	1.7602	3 30 5.6	14.263	1	1 56 22.64	1.9301	14 33 8.7	13.029
2	0 30 18.31	1.7620	3 44 21.2	14.257	2	1 58 18.61	1.9356	14 46 9.0	12.981
3	0 32 4.08	1.7637	3 58 36.4	14.250	3	2 0 14.91	1.9412	14 59 6.4	12.932
4	0 33 49.95	1.7655	4 12 51.2	14.243	4	2 2 11.55	1.9468	15 12 0.8	12.881
5	0 35 35.94	1.7674	4 27 5.5	14.234	5	2 4 8.53	1.9526	15 24 52.1	12.829
6	0 37 22.04	1.7694	4 41 19.3	14.225	6	2 6 5.86	1.9584	15 37 40.3	12.776
7	0 39 8.27	1.7715	4 55 32.5	14.214	7	2 8 3.54	1.9642	15 50 25.2	12.722
8	0 40 54.62	1.7737	5 9 45.0	14.203	8	2 10 1.57	1.9702	16 3 6.9	12.667
9	0 42 41.11	1.7759	5 23 56.9	14.192	9	2 11 59.96	1.9762	16 15 45.3	12.611
10	0 44 27.73	1.7782	5 38 8.0	14.179	10	2 13 58.72	1.9824	16 28 20.2	12.553
11	0 46 14.49	1.7806	5 52 18.4	14.166	11	2 15 57.85	1.9886	16 40 51.7	12.495
12	0 48 1.40	1.7830	6 6 28.0	14.152	12	2 17 57.35	1.9948	16 53 19.6	12.435
13	0 49 48.45	1.7856	6 20 36.7	14.137	13	2 19 57.23	2.0012	17 5 43.9	12.373
14	0 51 35.67	1.7883	6 34 44.5	14.122	14	2 21 57.49	2.0076	17 18 4.4	12.311
15	0 53 23.04	1.7909	6 48 51.3	14.105	15	2 23 58.14	2.0141	17 30 21.2	12.248
16	0 55 10.58	1.7937	7 2 57.1	14.088	16	2 25 59.18	2.0206	17 42 34.2	12.184
17	0 56 58.28	1.7965	7 17 1.9	14.070	17	2 28 0.61	2.0272	17 54 43.3	12.118
18	0 58 46.16	1.7994	7 31 5.5	14.051	18	2 30 2.45	2.0340	18 6 48.4	12.051
19	1 0 34.21	1.8024	7 45 8.0	14.032	19	2 32 4.69	2.0407	18 18 49.4	11.982
20	1 2 22.45	1.8056	7 59 9.3	14.011	20	2 34 7.33	2.0475	18 30 46.3	11.913
21	1 4 10.88	1.8088	8 13 9.3	13.990	21	2 36 10.39	2.0545	18 42 39.0	11.842
22	1 5 59.50	1.8119	8 27 8.1	13.968	22	2 38 13.87	2.0614	18 54 27.4	11.770
23	1 7 48.31	1.8153	8 41 5.5	13.945	23	2 40 17.76	2.0684	19 6 11.4	11.697
24	1 9 37.33	1.8187	N. 8 55 1.5	13.921	24	2 42 22.08	2.0755	N. 19 17 51.0	11.622

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THURSDAY 13.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	2 42 22.08	2.0755	N.19 17 51.0	11.622
1	2 44 26.82	2.0827	19 29 26.0	11.546
2	2 46 32.00	2.0900	19 40 56.4	11.468
3	2 48 37.62	2.0972	19 52 22.2	11.389
4	2 50 43.67	2.1045	20 3 43.2	11.309
5	2 52 50.16	2.1120	20 14 59.3	11.227
6	2 54 57.10	2.1195	20 26 10.5	11.145
7	2 57 4.50	2.1270	20 37 16.7	11.060
8	2 59 12.35	2.1346	20 48 17.7	10.974
9	3 1 20.65	2.1422	20 59 13.6	10.887
10	3 3 29.41	2.1498	21 10 4.2	10.799
11	3 5 38.63	2.1576	21 20 49.5	10.709
12	3 7 48.32	2.1654	21 31 29.3	10.617
13	3 9 58.48	2.1732	21 42 3.6	10.524
14	3 12 9.11	2.1812	21 52 32.2	10.430
15	3 14 20.22	2.1891	22 2 55.1	10.333
16	3 16 31.80	2.1970	22 13 12.2	10.236
17	3 18 43.86	2.2050	22 23 23.4	10.137
18	3 20 56.40	2.2131	22 33 28.6	10.037
19	3 23 9.43	2.2212	22 43 27.8	9.935
20	3 25 22.94	2.2293	22 53 20.8	9.831
21	3 27 36.94	2.2374	23 3 7.5	9.725
22	3 29 51.43	2.2456	23 12 47.8	9.618
23	3 32 6.41	2.2538	N.23 22 21.7	9.511

FRIDAY 14.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	3 34 21.89	2.2621	N.23 31 49.1	9.401
1	3 36 37.86	2.2703	23 41 9.8	9.289
2	3 38 54.32	2.2785	23 50 23.8	9.176
3	3 41 11.28	2.2868	23 59 30.9	9.061
4	3 43 28.74	2.2952	24 8 31.1	8.945
5	3 45 46.70	2.3035	24 17 24.3	8.827
6	3 48 5.16	2.3118	24 26 10.3	8.707
7	3 50 24.12	2.3201	24 34 49.1	8.586
8	3 52 43.57	2.3284	24 43 20.6	8.462
9	3 55 3.52	2.3368	24 51 44.6	8.337
10	3 57 23.98	2.3452	25 0 1.1	8.212
11	3 59 44.94	2.3534	25 8 10.0	8.084
12	4 2 6.39	2.3617	25 16 11.2	7.954
13	4 4 28.34	2.3700	25 24 4.5	7.822
14	4 6 50.79	2.3783	25 31 49.9	7.690
15	4 9 13.74	2.3866	25 39 27.3	7.556
16	4 11 37.18	2.3948	25 46 56.6	7.419
17	4 14 1.12	2.4032	25 54 17.7	7.282
18	4 16 25.56	2.4113	26 1 30.4	7.142
19	4 18 50.48	2.4194	26 8 34.7	7.001
20	4 21 15.89	2.4276	26 15 30.5	6.859
21	4 23 41.79	2.4357	26 22 17.8	6.715
22	4 26 8.18	2.4438	26 28 56.3	6.568
23	4 28 35.05	2.4518	26 35 26.0	6.421
24	4 31 2.39	2.4597	N.26 41 46.8	6.271

SATURDAY 15.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	4 31 2.39	2.4597	N.26 41 46.8	6.271
1	4 33 30.21	2.4676	26 47 58.5	6.119
2	4 35 58.50	2.4755	26 54 1.1	5.967
3	4 38 27.27	2.4833	26 59 54.5	5.812
4	4 40 56.50	2.4910	27 5 38.6	5.657
5	4 43 26.19	2.4987	27 11 13.3	5.499
6	4 45 56.34	2.5062	27 16 38.5	5.339
7	4 48 26.94	2.5137	27 21 54.0	5.178
8	4 50 57.98	2.5211	27 26 59.9	5.017
9	4 53 29.47	2.5285	27 31 56.0	4.853
10	4 56 1.40	2.5357	27 36 42.2	4.687
11	4 58 33.76	2.5429	27 41 18.4	4.519
12	5 1 6.55	2.5500	27 45 44.5	4.351
13	5 3 39.76	2.5570	27 50 0.5	4.181
14	5 6 13.39	2.5638	27 54 6.2	4.009
15	5 8 47.42	2.5706	27 58 1.6	3.837
16	5 11 21.86	2.5772	28 1 46.6	3.662
17	5 13 56.70	2.5838	28 5 21.0	3.486
18	5 16 31.92	2.5902	28 8 44.9	3.309
19	5 19 7.52	2.5965	28 11 58.1	3.130
20	5 21 43.50	2.6027	28 15 0.5	2.949
21	5 24 19.85	2.6087	28 17 52.0	2.767
22	5 26 56.55	2.6147	28 20 32.6	2.585
23	5 29 33.60	2.6204	N.28 23 2.2	2.402

SUNDAY 16.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	5 32 11.00	2.6261	N.28 25 20.8	2.217
1	5 34 48.73	2.6316	28 27 28.2	2.090
2	5 37 26.79	2.6370	28 29 24.4	1.842
3	5 40 5.17	2.6422	28 31 9.2	1.652
4	5 42 43.85	2.6472	28 32 42.7	1.463
5	5 45 22.83	2.6521	28 34 4.8	1.272
6	5 48 2.10	2.6568	28 35 15.4	1.079
7	5 50 41.65	2.6614	28 36 14.3	0.886
8	5 53 21.47	2.6658	28 37 1.7	0.692
9	5 56 1.55	2.6701	28 37 37.4	0.497
10	5 58 41.88	2.6742	28 38 1.3	0.301
11	6 1 22.46	2.6782	28 38 13.5	+0.104
12	6 4 3.26	2.6818	28 38 13.8	−0.094
13	6 6 44.28	2.6854	28 38 2.2	0.292
14	6 9 25.51	2.6888	28 37 38.7	0.492
15	6 12 6.94	2.6921	28 37 3.2	0.692
16	6 14 48.56	2.6952	28 36 15.6	0.893
17	6 17 30.36	2.6980	28 35 16.0	1.094
18	6 20 12.32	2.7007	28 34 4.3	1.297
19	6 22 54.44	2.7032	28 32 40.4	1.500
20	6 25 36.70	2.7054	28 31 4.3	1.703
21	6 28 19.09	2.7076	28 29 16.0	1.907
22	6 31 1.61	2.7096	28 27 15.5	2.111
23	6 33 44.24	2.7112	28 25 2.7	2.315
24	6 36 26.96	2.7128	N.28 22 37.7	2.520

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 17.					WEDNESDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	6 36 26.96	2.7128	N.28 22 37.7	2.520	0	8 45 6.86	2.5911	N.22 31 6.9	11.794
1	6 39 9.77	2.7142	28 20 0.3	2.725	1	8 47 42.16	2.5856	22 19 14.3	11.957
2	6 41 52.66	2.7154	28 17 10.7	2.930	2	8 50 17.13	2.5801	22 7 12.0	12.118
3	6 44 35.62	2.7164	28 14 8.7	3.137	3	8 52 51.77	2.5745	21 55 0.1	12.278
4	6 47 18.63	2.7172	28 10 54.3	3.342	4	8 55 26.07	2.5687	21 42 38.6	12.437
5	6 50 1.68	2.7177	28 7 27.6	3.547	5	8 58 0.02	2.5629	21 30 7.7	12.593
6	6 52 44.76	2.7182	28 3 48.6	3.752	6	9 0 33.62	2.5572	21 17 27.5	12.747
7	6 55 27.86	2.7184	27 59 57.3	3.958	7	9 3 6.88	2.5513	21 4 38.1	12.898
8	6 58 10.97	2.7185	27 55 53.6	4.164	8	9 5 39.78	2.5454	20 51 39.7	13.047
9	7 0 54.08	2.7183	27 51 37.6	4.370	9	9 8 12.33	2.5395	20 38 32.4	13.196
10	7 3 37.17	2.7180	27 47 9.2	4.576	10	9 10 44.52	2.5336	20 25 16.2	13.342
11	7 6 20.24	2.7176	27 42 28.5	4.781	11	9 13 16.36	2.5277	20 11 51.3	13.486
12	7 9 3.28	2.7169	27 37 35.5	4.986	12	9 15 47.84	2.5216	19 58 17.9	13.627
13	7 11 46.27	2.7160	27 32 30.2	5.191	13	9 18 18.95	2.5156	19 44 36.0	13.767
14	7 14 29.20	2.7149	27 27 12.6	5.395	14	9 20 49.71	2.5096	19 30 45.8	13.904
15	7 17 12.06	2.7137	27 21 42.8	5.598	15	9 23 20.10	2.5035	19 16 47.5	14.039
16	7 19 54.84	2.7122	27 16 0.8	5.802	16	9 25 50.13	2.4975	19 2 41.1	14.172
17	7 22 37.53	2.7107	27 10 6.6	6.005	17	9 28 19.80	2.4914	18 48 26.8	14.303
18	7 25 20.12	2.7089	27 4 0.2	6.207	18	9 30 49.10	2.4853	18 34 4.7	14.432
19	7 28 2.60	2.7071	26 57 41.7	6.409	19	9 33 18.04	2.4792	18 19 34.9	14.560
20	7 30 44.97	2.7050	26 51 11.1	6.611	20	9 35 46.61	2.4732	18 4 57.5	14.684
21	7 33 27.21	2.7027	26 44 28.4	6.811	21	9 38 14.82	2.4672	17 50 12.8	14.806
22	7 36 9.30	2.7003	26 37 33.8	7.010	22	9 40 42.67	2.4611	17 35 20.8	14.927
23	7 38 51.24	2.6977	N.26 30 27.2	7.209	23	9 43 10.15	2.4550	N.17 20 21.6	15.044
	TUESDAY 18.					THURSDAY 20.			
0	7 41 33.03	2.6951	N.26 23 8.7	7.407	0	9 45 37.27	2.4490	N.17 5 15.5	15.159
1	7 44 14.65	2.6922	26 15 38.3	7.605	1	9 48 4.03	2.4430	16 50 2.5	15.272
2	7 46 56.09	2.6891	26 7 56.1	7.801	2	9 50 30.43	2.4370	16 34 42.8	15.383
3	7 49 37.34	2.6859	26 0 2.2	7.996	3	9 52 56.47	2.4311	16 19 16.5	15.492
4	7 52 18.40	2.6826	25 51 56.6	8.190	4	9 55 22.16	2.4252	16 3 43.7	15.599
5	7 54 59.25	2.6791	25 43 39.4	8.382	5	9 57 47.49	2.4192	15 48 4.6	15.703
6	7 57 39.89	2.6755	25 35 10.7	8.575	6	10 0 12.47	2.4133	15 32 19.3	15.805
7	8 0 20.31	2.6717	25 26 30.4	8.767	7	10 2 37.09	2.4075	15 16 28.0	15.904
8	8 3 0.50	2.6679	25 17 38.7	8.956	8	10 5 1.37	2.4017	15 0 30.8	16.002
9	8 5 40.46	2.6639	25 8 35.7	9.144	9	10 7 25.30	2.3959	14 44 27.8	16.097
10	8 8 20.17	2.6598	24 59 21.4	9.331	10	10 9 48.88	2.3902	14 28 19.2	16.189
11	8 10 59.63	2.6556	24 49 56.0	9.517	11	10 12 12.13	2.3846	14 12 5.1	16.279
12	8 13 38.84	2.6512	24 40 19.4	9.702	12	10 14 35.03	2.3789	13 55 45.7	16.367
13	8 16 17.78	2.6467	24 30 31.8	9.884	13	10 16 57.60	2.3733	13 39 21.0	16.453
14	8 18 56.44	2.6421	24 20 33.3	10.066	14	10 19 19.83	2.3677	13 22 51.3	16.536
15	8 21 34.83	2.6374	24 10 23.9	10.246	15	10 21 41.73	2.3622	13 6 16.7	16.617
16	8 24 12.93	2.6326	24 0 3.8	10.424	16	10 24 3.30	2.3568	12 49 37.2	16.697
17	8 26 50.74	2.6277	23 49 33.0	10.602	17	10 26 24.55	2.3514	12 32 53.1	16.773
18	8 29 28.26	2.6228	23 38 51.6	10.777	18	10 28 45.47	2.3461	12 16 4.5	16.847
19	8 32 5.48	2.6177	23 27 59.8	10.950	19	10 31 6.08	2.3408	11 59 11.5	16.919
20	8 34 42.39	2.6126	23 16 57.6	11.122	20	10 33 26.37	2.3356	11 42 14.2	16.988
21	8 37 18.99	2.6073	23 5 45.1	11.293	21	10 35 46.35	2.3305	11 25 12.9	17.055
22	8 39 55.27	2.6020	22 54 22.4	11.462	22	10 38 6.03	2.3254	11 8 7.6	17.121
23	8 42 31.23	2.5966	22 42 49.6	11.629	23	10 40 25.40	2.3204	10 50 58.4	17.183
24	8 45 6.86	2.5911	N.22 31 6.9	11.794	24	10 42 44.48	2.3155	N.10 33 45.6	17.243

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 21.					SUNDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	10 42 44.48	2.3155	N. 10 33 45.6	17.243	0	12 29 39.39	2.1715	S. 3 41 48.7	17.616
1	10 45 3.26	2.3106	10 16 29.2	17.302	1	12 31 49.65	2.1706	3 59 24.5	17.576
2	10 47 21.75	2.3057	9 59 9.4	17.357	2	12 33 59.86	2.1697	4 16 57.8	17.534
3	10 49 39.95	2.3010	9 41 46.4	17.410	3	12 36 10.02	2.1690	4 34 28.6	17.491
4	10 51 57.87	2.2963	9 24 20.2	17.462	4	12 38 20.14	2.1683	4 51 56.7	17.446
5	10 54 15.51	2.2917	9 6 51.0	17.511	5	12 40 30.22	2.1677	5 9 22.1	17.399
6	10 56 32.87	2.2872	8 49 18.9	17.557	6	12 42 40.27	2.1672	5 26 44.6	17.350
7	10 58 49.97	2.2827	8 31 44.1	17.601	7	12 44 50.29	2.1668	5 44 4.1	17.300
8	11 1 6.80	2.2783	8 14 6.7	17.643	8	12 47 0.28	2.1664	6 1 20.6	17.249
9	11 3 23.37	2.2740	7 56 26.9	17.684	9	12 49 10.26	2.1662	6 18 34.0	17.196
10	11 5 39.68	2.2698	7 38 44.7	17.722	10	12 51 20.22	2.1660	6 35 44.1	17.140
11	11 7 55.75	2.2657	7 21 0.3	17.757	11	12 53 30.18	2.1659	6 52 50.8	17.083
12	11 10 11.57	2.2617	7 3 13.9	17.790	12	12 55 40.13	2.1658	7 9 54.1	17.026
13	11 12 27.15	2.2577	6 45 25.5	17.822	13	12 57 50.08	2.1658	7 26 53.9	16.966
14	11 14 42.49	2.2537	6 27 35.3	17.850	14	13 0 0.03	2.1660	7 43 50.0	16.904
15	11 16 57.60	2.2499	6 9 43.5	17.877	15	13 2 10.00	2.1662	8 0 42.4	16.842
16	11 19 12.48	2.2462	5 51 50.1	17.902	16	13 4 19.98	2.1664	8 17 31.0	16.777
17	11 21 27.14	2.2426	5 33 55.3	17.924	17	13 6 29.97	2.1667	8 34 15.7	16.712
18	11 23 41.59	2.2390	5 15 59.2	17.945	18	13 8 39.99	2.1672	8 50 56.4	16.644
19	11 25 55.82	2.2354	4 58 1.9	17.963	19	13 10 50.03	2.1676	9 7 33.0	16.575
20	11 28 9.84	2.2321	4 40 3.6	17.978	20	13 13 0.10	2.1682	9 24 5.4	16.504
21	11 30 23.67	2.2288	4 22 4.5	17.992	21	13 15 10.21	2.1688	9 40 33.5	16.432
22	11 32 37.29	2.2255	4 4 4.5	18.005	22	13 17 20.36	2.1695	9 56 57.3	16.359
23	11 34 50.73	2.2224	N. 3 46 3.9	18.014	23	13 19 30.55	2.1702	S. 10 13 16.6	16.284
	SATURDAY 22.					MONDAY 24.			
0	11 37 3.98	2.2193	N. 3 28 2.8	18.022	0	13 21 40.79	2.1711	S. 10 29 31.4	16.208
1	11 39 17.05	2.2163	3 10 1.3	18.027	1	13 23 51.08	2.1719	10 45 41.6	16.131
2	11 41 29.94	2.2134	2 51 59.5	18.031	2	13 26 1.42	2.1729	11 1 47.1	16.052
3	11 43 42.66	2.2106	2 33 57.6	18.033	3	13 28 11.83	2.1740	11 17 47.8	15.971
4	11 45 55.21	2.2078	2 15 55.6	18.033	4	13 30 22.30	2.1750	11 33 43.6	15.888
5	11 48 7.60	2.2052	1 57 53.7	18.030	5	13 32 32.83	2.1762	11 49 34.4	15.805
6	11 50 19.84	2.2027	1 39 52.0	18.025	6	13 34 43.44	2.1774	12 5 20.2	15.722
7	11 52 31.93	2.2002	1 21 50.7	18.018	7	13 36 54.12	2.1787	12 21 1.0	15.636
8	11 54 43.87	2.1978	1 3 49.8	18.009	8	13 39 4.88	2.1800	12 36 36.5	15.547
9	11 56 55.67	2.1956	0 45 49.6	17.998	9	13 41 15.72	2.1813	12 52 6.7	15.459
10	11 59 7.34	2.1933	0 27 50.0	17.987	10	13 43 26.64	2.1827	13 7 31.6	15.370
11	12 1 18.87	2.1912	N. 0 9 51.2	17.972	11	13 45 37.65	2.1843	13 22 51.1	15.279
12	12 3 30.28	2.1892	S. 0 8 6.7	17.956	12	13 47 48.76	2.1859	13 38 5.1	15.187
13	12 5 41.57	2.1872	0 26 3.5	17.937	13	13 49 59.96	2.1875	13 53 13.5	15.092
14	12 7 52.75	2.1854	0 43 59.2	17.918	14	13 52 11.26	2.1892	14 8 16.2	14.997
15	12 10 3.82	2.1837	1 1 53.7	17.897	15	13 54 22.66	2.1909	14 23 13.2	14.902
16	12 12 14.79	2.1820	1 19 46.8	17.872	16	13 56 34.17	2.1927	14 38 4.4	14.805
17	12 14 25.66	2.1803	1 37 38.3	17.846	17	13 58 45.78	2.1944	14 52 49.8	14.707
18	12 16 36.43	2.1788	1 55 28.3	17.819	18	14 0 57.50	2.1963	15 7 29.2	14.606
19	12 18 47.12	2.1774	2 13 16.6	17.790	19	14 3 9.34	2.1982	15 22 2.5	14.505
20	12 20 57.72	2.1760	2 31 3.1	17.759	20	14 5 21.29	2.2002	15 36 29.8	14.403
21	12 23 8.24	2.1747	2 48 47.7	17.726	21	14 7 33.36	2.2022	15 50 50.9	14.300
22	12 25 18.69	2.1736	3 6 30.2	17.691	22	14 9 45.56	2.2043	16 5 5.8	14.195
23	12 27 29.07	2.1725	3 24 10.6	17.654	23	14 11 57.88	2.2063	16 19 14.3	14.089
24	12 29 39.39	2.1715	S. 3 41 48.7	17.616	24	14 14 10.32	2.2084	S. 16 33 16.5	13.983

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 25.					THURSDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	14 14 10.32	2.2084	S.16 33 16.5	13.983	0	16 2 58.66	2.3240	S.25 22 48.5	7.763
1	14 16 22.89	2.2106	16 47 12.3	13.875	1	16 5 18.16	2.3259	25 30 29.9	7.616
2	14 18 35.59	2.2128	17 1 1.5	13.766	2	16 7 37.77	2.3278	25 38 2.4	7.468
3	14 20 48.43	2.2151	17 14 44.2	13.656	3	16 9 57.50	2.3297	25 45 26.1	7.321
4	14 23 1.40	2.2173	17 28 20.2	13.544	4	16 12 17.34	2.3315	25 52 40.9	7.172
5	14 25 14.51	2.2196	17 41 49.5	13.432	5	16 14 37.28	2.3332	25 59 46.7	7.022
6	14 27 27.75	2.2219	17 55 12.0	13.319	6	16 16 57.33	2.3350	26 6 43.6	6.873
7	14 29 41.14	2.2243	18 8 27.8	13.205	7	16 19 17.48	2.3367	26 13 31.5	6.724
8	14 31 54.67	2.2267	18 21 36.6	13.089	8	16 21 37.73	2.3382	26 20 10.5	6.574
9	14 34 8.34	2.2291	18 34 38.5	12.973	9	16 23 58.07	2.3397	26 26 40.4	6.423
10	14 36 22.16	2.2315	18 47 33.4	12.856	10	16 26 18.50	2.3412	26 33 1.3	6.272
11	14 38 36.12	2.2339	19 0 21.2	12.737	11	16 28 39.01	2.3426	26 39 13.1	6.121
12	14 40 50.23	2.2364	19 13 1.8	12.617	12	16 30 59.61	2.3439	26 45 15.8	5.969
13	14 43 4.49	2.2389	19 25 35.2	12.497	13	16 33 20.28	2.3452	26 51 9.4	5.817
14	14 45 18.90	2.2414	19 38 1.4	12.376	14	16 35 41.03	2.3464	26 56 53.9	5.665
15	14 47 33.46	2.2439	19 50 20.3	12.253	15	16 38 1.85	2.3475	27 2 29.2	5.512
16	14 49 48.17	2.2464	20 2 31.8	12.130	16	16 40 22.73	2.3485	27 7 55.4	5.361
17	14 52 3.03	2.2490	20 14 35.9	12.006	17	16 42 43.67	2.3495	27 13 12.5	5.208
18	14 54 18.05	2.2516	20 26 32.5	11.881	18	16 45 4.67	2.3504	27 18 20.4	5.054
19	14 56 33.22	2.2541	20 38 21.6	11.755	19	16 47 25.72	2.3513	27 23 19.0	4.901
20	14 58 48.54	2.2567	20 50 3.1	11.628	20	16 49 46.82	2.3521	27 28 8.5	4.748
21	15 1 4.02	2.2592	21 1 37.0	11.500	21	16 52 7.97	2.3527	27 32 48.8	4.594
22	15 3 19.65	2.2618	21 13 3.1	11.371	22	16 54 29.15	2.3533	27 37 19.8	4.440
23	15 5 35.44	2.2645	S.21 24 21.5	11.242	23	16 56 50.37	2.3539	S.27 41 41.6	4.287
	WEDNESDAY 26.					FRIDAY 28.			
0	15 7 51.39	2.2671	S.21 35 32.1	11.111	0	16 59 11.62	2.3543	S.27 45 54.2	4.132
1	15 10 7.49	2.2696	21 46 34.8	10.980	1	17 1 32.89	2.3547	27 49 57.5	3.978
2	15 12 23.74	2.2722	21 57 29.7	10.848	2	17 3 54.18	2.3549	27 53 51.6	3.824
3	15 14 40.15	2.2747	22 8 16.6	10.716	3	17 6 15.48	2.3552	27 57 36.4	3.670
4	15 16 56.71	2.2773	22 18 55.6	10.582	4	17 8 36.80	2.3553	28 1 12.0	3.516
5	15 19 13.43	2.2799	22 29 26.5	10.447	5	17 10 58.12	2.3553	28 4 38.3	3.361
6	15 21 30.30	2.2824	22 39 49.3	10.312	6	17 13 19.44	2.3552	28 7 55.3	3.207
7	15 23 47.32	2.2849	22 50 3.9	10.176	7	17 15 40.75	2.3551	28 11 3.1	3.052
8	15 26 4.49	2.2875	23 0 10.4	10.040	8	17 18 2.05	2.3549	28 14 1.6	2.898
9	15 28 21.82	2.2900	23 10 8.7	9.902	9	17 20 23.34	2.3546	28 16 50.9	2.744
10	15 30 39.29	2.2924	23 19 58.7	9.764	10	17 22 44.60	2.3542	28 19 30.9	2.590
11	15 32 56.91	2.2949	23 29 40.4	9.625	11	17 25 5.84	2.3537	28 22 1.7	2.437
12	15 35 14.68	2.2973	23 39 13.7	9.486	12	17 27 27.05	2.3532	28 24 23.3	2.282
13	15 37 32.59	2.2997	23 48 38.7	9.346	13	17 29 48.22	2.3525	28 26 35.6	2.128
14	15 39 50.64	2.3021	23 57 55.2	9.205	14	17 32 9.35	2.3517	28 28 38.7	1.974
15	15 42 8.84	2.3045	24 7 3.3	9.063	15	17 34 30.43	2.3508	28 30 32.5	1.820
16	15 44 27.18	2.3067	24 16 2.8	8.921	16	17 36 51.45	2.3499	28 32 17.1	1.667
17	15 46 45.65	2.3090	24 24 53.8	8.778	17	17 39 12.42	2.3489	28 33 52.6	1.514
18	15 49 4.26	2.3113	24 33 36.2	8.635	18	17 41 33.32	2.3477	28 35 18.8	1.361
19	15 51 23.01	2.3136	24 42 10.0	8.491	19	17 43 54.15	2.3466	28 36 35.9	1.208
20	15 53 41.89	2.3157	24 50 35.1	8.347	20	17 46 14.91	2.3453	28 37 43.8	1.056
21	15 56 0.89	2.3177	24 58 51.6	8.202	21	17 48 35.59	2.3440	28 38 42.6	0.903
22	15 58 20.02	2.3199	25 6 59.3	8.056	22	17 50 56.19	2.3425	28 39 32.2	0.751
23	16 0 39.28	2.3220	25 14 58.3	7.910	23	17 53 16.69	2.3409	28 40 12.7	0.600
24	16 2 58.66	2.3240	S.25 22 48.5	7.763	24	17 55 37.10	2.3392	S.28 40 44.2	0.448

GREENWICH MEAN TIME.

PHASES OF THE MOON.

		d	h	m
● **New Moon**	Feb.	5	17	21.9
☽ **First Quarter**		13	20	33.9
○ **Full Moon**		20	14	3.3
☾ **Last Quarter**		27	9	15.4

		d	h
☾ Apogee	Feb.	6	19.8
☾ Perigee		20	12.1

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Sat.	1	22 47 21.54	9.372	S. 7 42 3.2	+56.90	16 10.08	65.43	12 35.48	0.484
SUN.	2	22 51 6.19	9.350	7 19 14.2	57.17	16 9.84	65.36	12 23.62	0.504
Mon.	3	22 54 50.36	9.329	6 56 18.9	57.43	16 9.59	65.29	12 11.27	0.524
Tues.	4	22 58 34.07	9.311	6 33 17.6	+57.67	16 9.34	65.22	11 58.46	0.543
Wed.	5	23 2 17.33	9.293	6 10 10.7	57.89	16 9.08	65.15	11 45.20	0.561
Thur.	6	23 6 0.14	9.276	5 46 58.7	58.10	16 8.83	65.09	11 31.50	0.579
Fri.	7	23 9 42.54	9.259	5 23 42.0	+58.29	16 8.57	65.03	11 17.39	0.596
Sat.	8	23 13 24.55	9.242	5 0 21.0	58.46	16 8.31	64.97	11 2.87	0.613
SUN.	9	23 17 6.17	9.226	4 36 56.0	58.61	16 8.05	64.92	10 47.97	0.628
Mon.	10	23 20 47.42	9.211	4 13 27.5	+58.75	16 7.80	64.87	10 32.70	0.643
Tues.	11	23 24 28.31	9.197	3 49 55.9	58.87	16 7.54	64.82	10 17.09	0.657
Wed.	12	23 28 8.87	9.184	3 26 21.7	58.98	16 7.28	64.77	10 1.15	0.671
Thur.	13	23 31 49.12	9.171	3 2 45.1	+59.06	16 7.02	64.72	9 44.89	0.684
Fri.	14	23 35 29.07	9.159	2 39 6.6	59.12	16 6.76	64.68	9 28.33	0.696
Sat.	15	23 39 8.74	9.148	2 15 26.6	59.18	16 6.50	64.64	9 11.49	0.707
SUN.	16	23 42 48.15	9.138	1 51 45.5	+59.23	16 6.24	64.61	8 54.39	0.717
Mon.	17	23 46 27.33	9.128	1 28 3.7	59.25	16 5.97	64.58	8 37.06	0.726
Tues.	18	23 50 6.29	9.119	1 4 21.5	59.26	16 5.71	64.55	8 19.52	0.735
Wed.	19	23 53 45.05	9.112	0 40 39.2	+59.25	16 5.44	64.52	8 1.77	0.743
Thur.	20	23 57 23.63	9.105	S. 0 16 57.2	59.24	16 5.17	64.50	7 43.85	0.750
Fri.	21	0 1 2.07	9.100	N. 0 6 44.1	59.21	16 4.90	64.48	7 25.79	0.756
Sat.	22	0 4 40.39	9.095	0 30 24.5	+59.16	16 4.63	64.47	7 7.61	0.760
SUN.	23	0 8 18.61	9.091	0 54 3.6	59.10	16 4.35	64.46	6 49.33	0.764
Mon.	24	0 11 56.75	9.089	1 17 41.2	59.03	16 4.07	64.45	6 30.97	0.766
Tues.	25	0 15 34.84	9.087	1 41 16.9	+58.94	16 3.79	64.45	6 12.56	0.768
Wed.	26	0 19 12.92	9.086	2 4 50.3	58.84	16 3.51	64.44	5 54.13	0.768
Thur.	27	0 22 50.99	9.087	2 28 21.1	58.73	16 3.23	64.44	5 35.70	0.768
Fri.	28	0 26 29.08	9.088	2 51 49.0	+58.60	16 2.95	64.44	5 17.29	0.767
Sat.	29	0 30 7.21	9.090	3 15 13.6	58.45	16 2.66	64.44	4 58.91	0.765
SUN.	30	0 33 45.40	9.093	3 38 34.6	58.29	16 2.38	64.45	4 40.59	0.762
Mon.	31	0 37 23.66	9.096	4 1 51.7	58.12	16 2.09	64.46	4 22.35	0.758
Tues.	32	0 41 2.02	9.100	N. 4 25 4.5	+57.93	16 1.81	64.47	4 4.21	0.754

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0^{s}.18 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; north declinations increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Sat.	1	22 47 19.57	9.373	S. 7 42 15.2	+56.91	12 35.58	0.484	22 34 43.98
SUN.	2	22 51 4.26	9.351	7 19 26.1	57.18	12 23.72	0.504	22 38 40.54
Mon.	3	22 54 48.47	9.330	6 56 30.6	57.44	12 11.38	0.524	22 42 37.09
Tues.	4	22 58 32.21	9.312	6 33 29.1	+57.68	11 58.57	0.543	22 46 33.65
Wed.	5	23 2 15.50	9.294	6 10 22.0	57.90	11 45.31	0.561	22 50 30.20
Thur.	6	23 5 58.36	9.277	5 47 9.8	58.11	11 31.61	0.579	22 54 26.75
Fri.	7	23 9 40.80	9.260	5 23 52.9	+58.30	11 17.50	0.596	22 58 23.31
Sat.	8	23 13 22.84	9.244	5 0 31.7	58.47	11 2.98	0.613	23 2 19.86
SUN.	9	23 17 4.50	9.228	4 37 6.5	58.62	10 48.08	0.628	23 6 16.42
Mon.	10	23 20 45.79	9.213	4 13 37.8	+58.76	10 32.82	0.643	23 10 12.97
Tues.	11	23 24 26.73	9.199	3 50 6.0	58.88	10 17.20	0.657	23 14 9.52
Wed.	12	23 28 7.34	9.185	3 26 31.5	58.99	10 1.26	0.671	23 18 6.08
Thur.	13	23 31 47.63	9.171	3 2 54.7	+59.07	9 45.00	0.684	23 22 2.63
Fri.	14	23 35 27.62	9.159	2 39 16.0	59.14	9 28.44	0.696	23 25 59.19
Sat.	15	23 39 7.34	9.149	2 15 35.7	59.20	9 11.60	0.707	23 29 55.74
SUN.	16	23 42 46.80	9.139	1 51 54.3	+59.24	8 54.51	0.717	23 33 52.29
Mon.	17	23 46 26.02	9.130	1 28 12.2	59.26	8 37.17	0.726	23 37 48.85
Tues.	18	23 50 5.02	9.121	1 4 29.7	59.27	8 19.62	0.735	23 41 45.40
Wed.	19	23 53 43.83	9.113	0 40 47.1	+59.26	8 1.87	0.743	23 45 41.95
Thur.	20	23 57 22.46	9.106	S. 0 17 4.8	59.25	7 43.95	0.750	23 49 38.51
Fri.	21	0 1 0.95	9.101	N. 0 6 36.8	59.22	7 25.88	0.756	23 53 35.06
Sat.	22	0 4 39.31	9.097	0 30 17.5	+59.17	7 7.69	0.760	23 57 31.62
SUN.	23	0 8 17.58	9.093	0 53 57.0	59.11	6 49.41	0.764	0 1 28.17
Mon.	24	0 11 55.77	9.091	1 17 34.9	59.04	6 31.05	0.766	0 5 24.72
Tues.	25	0 15 33.91	9.089	1 41 10.8	+58.95	6 12.64	0.768	0 9 21.28
Wed.	26	0 19 12.03	9.088	2 4 44.5	58.85	5 54.20	0.768	0 13 17.83
Thur.	27	0 22 50.15	9.089	2 28 15.6	58.74	5 35.77	0.768	0 17 14.38
Fri.	28	0 26 28.29	9.090	2 51 43.8	+58.61	5 17.35	0.767	0 21 10.94
Sat.	29	0 30 6.46	9.092	3 15 8.8	58.47	4 58.97	0.765	0 25 7.49
SUN.	30	0 33 44.69	9.095	3 38 30.2	58.31	4 40.65	0.762	0 29 4.04
Mon.	31	0 37 23.00	9.098	4 1 47.5	58.14	4 22.40	0.758	0 33 0.60
Tues.	32	0 41 1.41	9.102	N. 4 25 0.5	+57.95	4 4.25	0.754	0 36 57.15

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; north declinations increasing.

Diff. for 1 Hour.
$+9^{s}.8565$.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S True Longitude. λ	THE SUN'S True Longitude. λ′	THE SUN'S Diff. for 1 Hour.	THE SUN'S Latitude.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		° ′ ″	′ ″	″	″			h m s
1	60	340 19 19.8	19 12.0	150.50	−0.60	9.996 1419	+46.3	1 25 2.05
2	61	341 19 30.9	19 23.0	150.43	0.62	9.996 2534	46.6	1 21 6.14
3	62	342 19 40.4	19 32.4	150.36	0.59	9.996 3657	46.9	1 17 10.23
4	63	343 19 48.3	19 40.1	150.29	−0.53	9.996 4786	+47.2	1 13 14.32
5	64	344 19 54.4	19 46.1	150.22	0.45	9.996 5922	47.4	1 9 18.42
6	65	345 19 58.7	19 50.3	150.15	0.35	9.996 7063	47.6	1 5 22.51
7	66	346 20 1.3	19 52.8	150.07	−0.23	9.996 8208	+47.8	1 1 26.60
8	67	347 20 2.0	19 53.4	149.99	−0.11	9.996 9356	47.9	0 57 30.69
9	68	348 20 0.8	19 52.1	149.91	+0.01	9.997 0508	48.0	0 53 34.78
10	69	349 19 57.6	19 48.8	149.82	+0.15	9.997 1663	+48.1	0 49 38.88
11	70	350 19 52.3	19 43.4	149.74	0.27	9.997 2821	48.3	0 45 42.97
12	71	351 19 44.9	19 35.9	149.65	0.37	9.997 3982	48.5	0 41 47.06
13	72	352 19 35.3	19 26.2	149.56	+0.46	9.997 5146	+48.6	0 37 51.15
14	73	353 19 23.5	19 14.3	149.46	0.53	9.997 6314	48.8	0 33 55.24
15	74	354 19 9.5	19 0.1	149.37	0.58	9.997 7487	49.0	0 29 59.33
16	75	355 18 53.2	18 43.7	149.27	+0.59	9.997 8666	+49.2	0 26 3.43
17	76	356 18 34.5	18 24.9	149.17	0.56	9.997 9851	49.5	0 22 7.52
18	77	357 18 13.5	18 3.8	149.07	0.49	9.998 1044	49.9	0 18 11.61
19	78	358 17 50.3	17 40.5	148.98	+0.40	9.998 2245	+50.3	0 14 15.70
20	79	359 17 24.8	17 14.9	148.89	0.30	9.998 3456	50.7	0 10 19.80
21	80	0 16 57.2	16 47.1	148.80	0.17	9.998 4678	51.2	0 6 23.89
22	81	1 16 27.4	16 17.3	148.72	+0.03	9.998 5910	+51.6	0 2 27.98 23 58 32.07
23	82	2 15 55.6	15 45.4	148.63	−0.12	9.998 7153	52.0	23 54 36.16
24	83	3 15 21.9	15 11.5	148.55	0.25	9.998 8405	52.3	23 50 40.25
25	84	4 14 46.3	14 35.8	148.47	−0.36	9.998 9666	+52.6	23 46 44.35
26	85	5 14 8.8	13 58.2	148.40	0.46	9.999 0934	52.9	23 42 48.44
27	86	6 13 29.5	13 18.8	148.32	0.53	9.999 2207	53.1	23 38 52.53
28	87	7 12 48.4	12 37.6	148.25	−0.58	9.999 3484	+53.2	23 34 56.62
29	88	8 12 5.5	11 54.6	148.17	0.59	9.999 4763	53.3	23 31 0.72
30	89	9 11 20.9	11 9.9	148.10	0.57	9.999 6043	53.3	23 27 4.81
31	90	10 10 34.5	10 23.4	148.02	0.53	9.999 7323	53.3	23 23 8.90
32	91	11 9 46.3	9 35.1	147.95	−0.46	9.999 8601	+53.2	23 19 12.99

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ′ are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour, −9ˢ.8296. (Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 5.7	15 1.1	55 18.37	−1.522	55 1.18	−1.342	20 4.1	2.20	23.3
2	14 57.0	14 53.5	54 46.16	1.162	54 33.27	0.986	20 55.7	2.09	24.3
3	14 50.5	14 48.2	54 22.47	0.816	54 13.67	0.652	21 44.4	1.97	25.3
4	14 46.3	14 44.9	54 6.78	−0.498	54 1.68	−0.353	22 30.0	1.84	26.3
5	14 44.0	14 43.5	53 58.28	−0.216	53 56.47	−0.088	23 12.8	1.73	27.3
6	14 43.4	14 43.7	53 56.15	+0.033	53 57.23	+0.147	23 53.4	1.66	28.3
7	14 44.3	14 45.3	53 59.65	+0.255	54 3.33	+0.358	☌	. .	29.3
8	14 46.6	14 48.3	54 8.25	0.460	54 14.38	0.560	0 32.8	1.63	0.5
9	14 50.3	14 52.6	54 21.70	0.660	54 30.22	0.762	1 12.0	1.64	1.5
10	14 55.3	14 58.3	54 39.98	+0.867	54 51.02	+0.975	1 51.8	1.70	2.5
11	15 1.7	15 5.4	55 3.36	1.084	55 17.06	1.201	2 33.5	1.80	3.5
12	15 9.5	15 14.0	55 32.18	1.320	55 48.74	1.439	3 18.2	1.94	4.5
13	15 19.0	15 24.2	56 6.72	+1.556	56 26.10	+1.673	4 6.8	2.11	5.5
14	15 29.9	15 35.9	56 46.84	1.782	57 8.84	1.882	4 59.8	2.31	6.5
15	15 42.2	15 48.7	57 31.94	1.964	57 55.89	2.023	5 57.3	2.47	7.5
16	15 55.4	16 2.1	58 20.40	+2.056	58 45.11	+2.056	6 57.8	2.55	8.5
17	16 8.8	16 15.2	59 9.57	2.016	59 33.28	1.928	7 59.2	2.54	9.5
18	16 21.3	16 26.9	59 55.64	1.789	60 16.04	1.601	8 59.2	2.45	10.5
19	16 31.8	16 35.7	60 33.86	+1.360	60 48.50	+1.071	9 56.4	2.32	11.5
20	16 38.7	16 40.5	60 59.38	+0.737	61 6.05	+0.372	10 50.6	2.20	12.5
21	16 41.1	16 40.4	61 8.19	−0.017	61 5.60	−0.415	11 42.4	2.13	13.5
22	16 38.4	16 35.2	60 58.30	−0.801	60 46.45	−1.170	12 33.1	2.11	14.5
23	16 30.8	16 25.4	60 30.37	1.501	60 10.58	1.789	13 23.9	2.14	15.5
24	16 19.1	16 12.2	59 47.64	2.024	59 22.21	2.201	14 15.8	2.20	16.5
25	16 4.8	15 57.1	58 55.02	−2.321	58 26.72	−2.386	15 9.6	2.28	17.5
26	15 49.3	15 41.5	57 57.97	2.396	57 29.40	2.357	16 5.0	2.33	18.5
27	15 33.9	15 26.6	57 1.56	2.277	56 34.90	2.161	17 1.2	2.34	19.5
28	15 19.8	15 13.5	56 9.80	−2.017	55 46.57	−1.851	17 56.8	2.28	20.5
29	15 7.7	15 2.6	55 25.46	1.666	55 6.64	1.470	18 50.2	2.16	21.5
30	14 58.1	14 54.3	54 50.22	1.267	54 36.24	1.064	19 40.4	2.02	22.5
31	14 51.1	14 48.7	54 24.71	0.859	54 15.61	0.660	20 27.2	1.89	23.5
32	14 46.8	14 45.6	54 8.88	−0.466	54 4.42	−0.281	21 10.9	1.76	24.5

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 1.					MONDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	17 55 37.10	2.3392	S.28 40 44.2	0.448	0	19 44 30.49	2.1729	S.26 17 18.0	6.173
1	17 57 57.40	2.3375	28 41 6.5	0.297	1	19 46 40.72	2.1682	26 11 4.0	6.292
2	18 0 17.60	2.3357	28 41 19.8	−0.147	2	19 48 50.67	2.1634	26 4 42.9	6.412
3	18 2 37.69	2.3338	28 41 24.1	+0.003	3	19 51 0.33	2.1586	25 58 14.6	6.530
4	18 4 57.66	2.3318	28 41 19.4	0.153	4	19 53 9.70	2.1537	25 51 39.3	6.647
5	18 7 17.51	2.3297	28 41 5.7	0.304	5	19 55 18.77	2.1488	25 44 56.9	6.764
6	18 9 37.23	2.3276	28 40 43.0	0.453	6	19 57 27.56	2.1440	25 38 7.6	6.879
7	18 11 56.82	2.3253	28 40 11.3	0.602	7	19 59 36.05	2.1391	25 31 11.4	6.994
8	18 14 16.27	2.3229	28 39 30.7	0.750	8	20 1 44.25	2.1342	25 24 8.3	7.107
9	18 16 35.57	2.3205	28 38 41.3	0.897	9	20 3 52.15	2.1292	25 16 58.5	7.220
10	18 18 54.73	2.3181	28 37 43.0	1.045	10	20 5 59.75	2.1242	25 9 41.9	7.332
11	18 21 13.74	2.3155	28 36 35.9	1.192	11	20 8 7.06	2.1193	25 2 18.6	7.443
12	18 23 32.59	2.3127	28 35 20.0	1.338	12	20 10 14.07	2.1143	24 54 48.7	7.553
13	18 25 51.27	2.3100	28 33 55.3	1.484	13	20 12 20.78	2.1093	24 47 12.2	7.662
14	18 28 9.79	2.3072	28 32 21.9	1.629	14	20 14 27.19	2.1043	24 39 29.2	7.770
15	18 30 28.14	2.3043	28 30 39.8	1.775	15	20 16 33.30	2.0994	24 31 39.8	7.877
16	18 32 46.31	2.3013	28 28 49.0	1.919	16	20 18 39.12	2.0944	24 23 43 9	7.984
17	18 35 4.30	2.2982	28 26 49.5	2.062	17	20 20 44.63	2.0894	24 15 41.7	8.089
18	18 37 22.10	2.2952	28 24 41.4	2.206	18	20 22 49.85	2.0844	24 7 33.2	8.194
19	18 39 39.72	2.2920	28 22 24.8	2.347	19	20 24 54.76	2.0793	23 59 18.4	8.297
20	18 41 57.14	2.2887	28 19 59.7	2.490	20	20 26 59.37	2.0744	23 50 57.5	8.400
21	18 44 14.36	2.2852	28 17 26.0	2.632	21	20 29 3.69	2.0695	23 42 30.4	8.502
22	18 46 31.37	2.2818	28 14 43.9	2.772	22	20 31 7.71	2.0644	23 33 57.2	8.603
23	18 48 48.18	2.2784	S.28 11 53.3	2.912	23	20 33 11.42	2.0594	S.23 25 18.0	8.702
	SUNDAY 2.					TUESDAY 4.			
0	18 51 4.78	2.2748	S.28 8 54.4	3.052	0	20 35 14.84	2.0545	S.23 16 32.9	8.802
1	18 53 21.16	2.2712	28 5 47.1	3.191	1	20 37 17.96	2.0495	23 7 41.8	8.900
2	18 55 37.32	2.2675	28 2 31.5	3.328	2	20 39 20.78	2.0445	22 58 44.9	8.997
3	18 57 53.26	2.2637	27 59 7.7	3.466	3	20 41 23.30	2.0396	22 49 42.2	9.093
4	19 0 8.97	2.2599	27 55 35.6	3.602	4	20 43 25.53	2.0347	22 40 33.7	9.188
5	19 2 24.45	2.2561	27 51 55.4	3.738	5	20 45 27.46	2.0297	22 31 19.6	9.282
6	19 4 39.70	2.2522	27 48 7.0	3.874	6	20 47 29.10	2.0248	22 21 59.8	9.376
7	19 6 54.71	2.2482	27 44 10.5	4.008	7	20 49 30.44	2.0199	22 12 34.5	9.468
8	19 9 9.48	2.2441	27 40 6.0	4.142	8	20 51 31.49	2.0150	22 3 3.6	9.560
9	19 11 24.00	2.2400	27 35 53.5	4.274	9	20 53 32.24	2.0102	21 53 27.3	9.651
10	19 13 38.28	2.2358	27 31 33.1	4.407	10	20 55 32.71	2.0053	21 43 45.5	9.740
11	19 15 52.30	2.2316	27 27 4.7	4.538	11	20 57 32.88	2.0005	21 33 58.5	9.828
12	19 18 6.07	2.2273	27 22 28.5	4.669	12	20 59 32.77	1.9957	21 24 6.1	9.917
13	19 20 19.58	2.2230	27 17 44.4	4.799	13	21 1 32.37	1.9910	21 14 8.5	10.003
14	19 22 32.83	2.2187	27 12 52.6	4.927	14	21 3 31.69	1.9862	21 4 5.7	10.090
15	19 24 45.82	2.2142	27 7 53.1	5.056	15	21 5 30.72	1.9815	20 53 57.7	10.175
16	19 26 58.54	2.2098	27 2 45.9	5.183	16	21 7 29.47	1.9768	20 43 44.7	10.259
17	19 29 11.00	2.2053	26 57 31.1	5.310	17	21 9 27.94	1.9722	20 33 26.6	10.342
18	19 31 23.18	2.2008	26 52 8.7	5.437	18	21 11 26.13	1.9675	20 23 3.6	10.424
19	19 33 35.10	2.1963	26 46 38.7	5.562	19	21 13 24.04	1.9629	20 12 35.7	10.506
20	19 35 46.74	2.1916	26 41 1.3	5.685	20	21 15 21.68	1.9583	20 2 2.9	10.587
21	19 37 58.09	2.1869	26 35 16.5	5.808	21	21 17 19.04	1.9537	19 51 25.3	10.666
22	19 40 9.17	2.1823	26 29 24.3	5.931	22	21 19 16.13	1.9492	19 40 43.0	10.744
23	19 42 19.97	2.1777	26 23 24.8	6.052	23	21 21 12.95	1.9447	19 29 56.0	10.822
24	19 44 30.49	2.1729	S.26 17 18.0	6.173	24	21 23 9.50	1.9403	S.19 19 4.3	10.900

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 5.					**FRIDAY 7.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	21 23 9.50	1.9403	S. 19 19 4.3	10.900	0	22 51 59.93	1.7808	S. 9 23 55.6	13.575
1	21 25 5.79	1.9359	19 8 8.0	10.975	1	22 53 46.72	1.7788	9 10 20.0	13.610
2	21 27 1.81	1.9315	18 57 7.3	11.050	2	22 55 33.39	1.7769	8 56 42.4	13.644
3	21 28 57.57	1.9272	18 46 2.0	11.125	3	22 57 19.95	1.7751	8 43 2.7	13.679
4	21 30 53.07	1.9228	18 34 52.3	11.198	4	22 59 6.40	1.7732	8 29 20.9	13.712
5	21 32 48.31	1.9186	18 23 38.3	11.270	5	23 0 52.74	1.7715	8 15 37.2	13.744
6	21 34 43.30	1.9144	18 12 19.9	11.342	6	23 2 38.98	1.7698	8 1 51.6	13.776
7	21 36 38.04	1.9102	18 0 57.3	11.412	7	23 4 25.12	1.7682	7 48 4.1	13.807
8	21 38 32.53	1.9061	17 49 30.4	11.482	8	23 6 11.16	1.7666	7 34 14.7	13.837
9	21 40 26.77	1.9020	17 37 59.4	11.551	9	23 7 57.11	1.7652	7 20 23.6	13.867
10	21 42 20.77	1.8979	17 26 24.3	11.619	10	23 9 42.98	1.7637	7 6 30.8	13.894
11	21 44 14.52	1.8939	17 14 45.1	11.686	11	23 11 28.76	1.7623	6 52 36.3	13.922
12	21 46 8.04	1.8900	17 3 2.0	11.752	12	23 13 14.46	1.7610	6 38 40.1	13.949
13	21 48 1.32	1.8860	16 51 14.9	11.817	13	23 15 0.08	1.7598	6 24 42.4	13.975
14	21 49 54.36	1.8821	16 39 23.9	11.882	14	23 16 45.64	1.7587	6 10 43.1	14.001
15	21 51 47.17	1.8783	16 27 29.1	11.945	15	23 18 31.12	1.7575	5 56 42.3	14.026
16	21 53 39.76	1.8746	16 15 30.5	12.008	16	23 20 16.54	1.7564	5 42 40.0	14.050
17	21 55 32.12	1.8707	16 3 28.1	12.071	17	23 22 1.89	1.7554	5 28 36.3	14.072
18	21 57 24.25	1.8670	15 51 22.0	12.132	18	23 23 47.19	1.7545	5 14 31.3	14.095
19	21 59 16.16	1.8634	15 39 12.3	12.192	19	23 25 32.43	1.7537	5 0 24.9	14.117
20	22 1 7.86	1.8599	15 26 59.0	12.251	20	23 27 17.63	1.7529	4 46 17.3	14.137
21	22 2 59.35	1.8563	15 14 42.2	12.309	21	23 29 2.78	1.7521	4 32 8.5	14.157
22	22 4 50.62	1.8528	15 2 21.9	12.367	22	23 30 47.88	1.7514	4 17 58.5	14.177
23	22 6 41.69	1.8494	S. 14 49 58.2	12.423	23	23 32 32.95	1.7508	S. 4 3 47.3	14.195
	THURSDAY 6.					**SATURDAY 8.**			
0	22 8 32.55	1.8459	S. 14 37 31.1	12.479	0	23 34 17.98	1.7502	S. 3 49 35.1	14.212
1	22 10 23.20	1.8426	14 25 0.7	12.534	1	23 36 2.98	1.7498	3 35 21.8	14.229
2	22 12 13.66	1.8393	14 12 27.0	12.589	2	23 37 47.96	1.7494	3 21 7.6	14.245
3	22 14 3.92	1.8361	13 59 50.0	12.642	3	23 39 32.91	1.7491	3 6 52.4	14.261
4	22 15 53.99	1.8329	13 47 9.9	12.695	4	23 41 17.85	1.7488	2 52 36.3	14.275
5	22 17 43.87	1.8297	13 34 26.6	12.747	5	23 43 2.77	1.7486	2 38 19.4	14.289
6	22 19 33.56	1.8267	13 21 40.2	12.797	6	23 44 47.68	1.7485	2 24 1.6	14.302
7	22 21 23.07	1.8237	13 8 50.9	12.847	7	23 46 32.59	1.7484	2 9 43.1	14.314
8	22 23 12.40	1.8207	12 55 58.5	12.897	8	23 48 17.49	1.7483	1 55 23.9	14.326
9	22 25 1.55	1.8177	12 43 3.2	12.945	9	23 50 2.39	1.7484	1 41 4.0	14.337
10	22 26 50.53	1.8149	12 30 5.1	12.992	10	23 51 47.30	1.7486	1 26 43.5	14.346
11	22 28 39.34	1.8121	12 17 4.1	13.040	11	23 53 32.22	1.7487	1 12 22.5	14.355
12	22 30 27.98	1.8093	12 4 0.3	13.086	12	23 55 17.15	1.7490	0 58 0.9	14.364
13	22 32 16.46	1.8067	11 50 53.8	13.131	13	23 57 2.10	1.7493	0 43 38.8	14.372
14	22 34 4.78	1.8040	11 37 44.6	13.175	14	23 58 47.07	1.7497	0 29 16.3	14.378
15	22 35 52.94	1.8014	11 24 32.8	13.218	15	0 0 32.07	1.7502	0 14 53.4	14.384
16	22 37 40.95	1.7989	11 11 18.4	13.262	16	0 2 17.10	1.7507	S. 0 0 30.2	14.389
17	22 39 28.81	1.7964	10 58 1.4	13.304	17	0 4 2.16	1.7513	N. 0 13 53.3	14.393
18	22 41 16.52	1.7940	10 44 41.9	13.345	18	0 5 47.26	1.7520	0 28 17.0	14.397
19	22 43 4.09	1.7917	10 31 20.0	13.385	19	0 7 32.40	1.7527	0 42 41.0	14.401
20	22 44 51.52	1.7894	10 17 55.7	13.424	20	0 9 17.59	1.7535	0 57 5.1	14.403
21	22 46 38.82	1.7872	10 4 29.1	13.463	21	0 11 2.82	1.7543	1 11 29.3	14.404
22	22 48 25.98	1.7850	9 51 0.2	13.501	22	0 12 48.11	1.7553	1 25 53.6	14.404
23	22 50 13.02	1.7829	9 37 29.0	13.538	23	0 14 33.46	1.7564	1 40 17.8	14.403
24	22 51 59.93	1.7808	S. 9 23 55.6	13.575	24	0 16 18.88	1.7575	N. 1 54 42.0	14.402

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 9.					TUESDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	0 16 18.88	1.7575	N. 1 54 42.0	14.402	0	1 43 15.17	1.8922	N. 13 8 53.3	13.348
1	0 18 4.36	1.7586	2 9 6.1	14.401	1	1 45 8.84	1.8968	13 22 12.9	13.303
2	0 19 49.91	1.7598	2 23 30.1	14.398	2	1 47 2.79	1.9015	13 35 29.7	13.257
3	0 21 35.54	1.7611	2 37 53.9	14.394	3	1 48 57.02	1.9061	13 48 43.8	13.211
4	0 23 21.24	1.7624	2 52 17.4	14.390	4	1 50 51.52	1.9108	14 1 55.0	13.162
5	0 25 7.03	1.7639	3 6 40.7	14.385	5	1 52 46.32	1.9157	14 15 3.3	13.113
6	0 26 52.91	1.7654	3 21 3.6	14.379	6	1 54 41.41	1.9206	14 28 8.7	13.064
7	0 28 38.88	1.7669	3 35 26.2	14.372	7	1 56 36.79	1.9255	14 41 11.0	13.013
8	0 30 24.94	1.7686	3 49 48.3	14.365	8	1 58 32.47	1.9306	14 54 10.2	12.961
9	0 32 11.11	1.7703	4 4 10.0	14.357	9	2 0 28.46	1.9357	15 7 6.3	12.908
10	0 33 57.38	1.7721	4 18 31.1	14.347	10	2 2 24.75	1.9408	15 19 59.2	12.854
11	0 35 43.76	1.7739	4 32 51.7	14.337	11	2 4 21.35	1.9460	15 32 48.8	12.798
12	0 37 30.25	1.7758	4 47 11.6	14.326	12	2 6 18.27	1.9513	15 45 35.0	12.742
13	0 39 16.86	1.7778	5 1 30.8	14.314	13	2 8 15.51	1.9567	15 58 17.8	12.684
14	0 41 3.59	1.7799	5 15 49.3	14.302	14	2 10 13.07	1.9621	16 10 57.1	12.626
15	0 42 50.45	1.7820	5 30 7.1	14.289	15	2 12 10.96	1.9675	16 23 32.9	12.567
16	0 44 37.43	1.7842	5 44 24.0	14.275	16	2 14 9.17	1.9731	16 36 5.1	12.505
17	0 46 24.55	1.7865	5 58 40.1	14.260	17	2 16 7.73	1.9787	16 48 33.5	12.442
18	0 48 11.81	1.7888	6 12 55.2	14.243	18	2 18 6.62	1.9843	17 0 58.2	12.380
19	0 49 59.21	1.7912	6 27 9.3	14.227	19	2 20 5.85	1.9901	17 13 19.1	12.316
20	0 51 46.76	1.7937	6 41 22.4	14.209	20	2 22 5.43	1.9959	17 25 36.1	12.250
21	0 53 34.46	1.7963	6 55 34.4	14.191	21	2 24 5.36	2.0017	17 37 49.1	12.183
22	0 55 22.32	1.7989	7 9 45.3	14.172	22	2 26 5.64	2.0077	17 49 58.1	12.116
23	0 57 10.33	1.8016	N. 7 23 55.0	14.152	23	2 28 6.28	2.0137	N. 18 2 3.0	12.047
	MONDAY 10.					WEDNESDAY 12.			
0	0 58 58.51	1.8044	N. 7 38 3.5	14.130	0	2 30 7.28	2.0197	N. 18 14 3.7	11.977
1	1 0 46.86	1.8072	7 52 10.7	14.108	1	2 32 8.64	2.0257	18 26 0.2	11.905
2	1 2 35.38	1.8102	8 6 16.5	14.086	2	2 34 10.37	2.0319	18 37 52.3	11.832
3	1 4 24.08	1.8132	8 20 20.9	14.062	3	2 36 12.47	2.0382	18 49 40.0	11.758
4	1 6 12.96	1.8162	8 34 23.9	14.037	4	2 38 14.95	2.0444	19 1 23.3	11.683
5	1 8 2.02	1.8193	8 48 25.4	14.012	5	2 40 17.80	2.0507	19 13 2.0	11.607
6	1 9 51.27	1.8225	9 2 25.3	13.985	6	2 42 21.03	2.0570	19 24 36.1	11.529
7	1 11 40.72	1.8257	9 16 23.6	13.957	7	2 44 24.64	2.0634	19 36 5.5	11.451
8	1 13 30.36	1.8291	9 30 20.2	13.929	8	2 46 28.64	2.0700	19 47 30.2	11.371
9	1 15 20.21	1.8325	9 44 15.1	13.900	9	2 48 33.04	2.0765	19 58 50.0	11.289
10	1 17 10.26	1.8360	9 58 8.2	13.870	10	2 50 37.82	2.0830	20 10 4.9	11.207
11	1 19 0.53	1.8396	10 11 59.5	13.839	11	2 52 43.00	2.0896	20 21 14.8	11.122
12	1 20 51.01	1.8432	10 25 48.9	13.807	12	2 54 48.57	2.0962	20 32 19.6	11.037
13	1 22 41.71	1.8469	10 39 36.3	13.774	13	2 56 54.55	2.1030	20 43 19.3	10.951
14	1 24 32.64	1.8507	10 53 21.8	13.741	14	2 59 0.93	2.1097	20 54 13.7	10.862
15	1 26 23.80	1.8546	11 7 5.2	13.706	15	3 1 7.71	2.1164	21 5 2.8	10.773
16	1 28 15.19	1.8584	11 20 46.5	13.670	16	3 3 14.90	2.1232	21 15 46.5	10.683
17	1 30 6.81	1.8624	11 34 25.6	13.632	17	3 5 22.50	2.1302	21 26 24.8	10.592
18	1 31 58.68	1.8665	11 48 2.4	13.595	18	3 7 30.52	2.1371	21 36 57.5	10.498
19	1 33 50.79	1.8706	12 1 37.0	13.557	19	3 9 38.95	2.1440	21 47 24.6	10.404
20	1 35 43.15	1.8747	12 15 9.2	13.517	20	3 11 47.80	2.1510	21 57 46.0	10.308
21	1 37 35.76	1.8790	12 28 39.0	13.476	21	3 13 57.07	2.1580	22 8 1.6	10.211
22	1 39 28.63	1.8835	12 42 6.3	13.434	22	3 16 6.76	2.1650	22 18 11.3	10.112
23	1 41 21.77	1.8878	12 55 31.1	13.392	23	3 18 16.87	2.1720	22 28 15.1	10.013
24	1 43 15.17	1.8922	N. 13 8 53.3	13.348	24	3 20 27.40	2.1791	N. 22 38 12.9	9.912

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 13.					SATURDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	3 20 27.40	2.1791	N.22 38 12.9	9.912	0	5 13 12.35	2.5061	N.28 10 44.1	3.412
1	3 22 38.36	2.1862	22 48 4.5	9.809	1	5 15 42.88	2.5116	28 14 3.8	3.244
2	3 24 49.75	2.1934	22 57 50.0	9.706	2	5 18 13.74	2.5169	28 17 13.4	3.075
3	3 27 1.57	2.2005	23 7 29.2	9.600	3	5 20 44.91	2.5222	28 20 12.8	2.905
4	3 29 13.81	2.2077	23 17 2.0	9.493	4	5 23 16.40	2.5273	28 23 2.0	2.734
5	3 31 26.49	2.2149	23 26 28.4	9.385	5	5 25 48.19	2.5322	28 25 40.9	2.562
6	3 33 39.60	2.2221	23 35 48.2	9.275	6	5 28 20.27	2.5371	28 28 9.4	2.388
7	3 35 53.14	2.2293	23 45 1.4	9.164	7	5 30 52.64	2.5419	28 30 27.5	2.214
8	3 38 7.12	2.2366	23 54 7.9	9.052	8	5 33 25.30	2.5466	28 32 35.1	2.039
9	3 40 21.53	2.2438	24 3 7.7	8.939	9	5 35 58.23	2.5511	28 34 32.2	1.862
10	3 42 36.38	2.2511	24 12 0.6	8.823	10	5 38 31.43	2.5554	28 36 18.6	1.685
11	3 44 51.66	2.2583	24 20 46.5	8.707	11	5 41 4.88	2.5597	28 37 54.4	1.507
12	3 47 7.38	2.2657	24 29 25.4	8.589	12	5 43 38.59	2.5639	28 39 19.5	1.328
13	3 49 23.54	2.2729	24 37 57.2	8.469	13	5 46 12.55	2.5679	28 40 33.8	1.148
14	3 51 40.13	2.2801	24 46 21.7	8.348	14	5 48 46.74	2.5717	28 41 37.3	0.967
15	3 53 57.15	2.2873	24 54 39.0	8.227	15	5 51 21.16	2.5755	28 42 29.8	0.785
16	3 56 14.61	2.2946	25 2 48.9	8.103	16	5 53 55.80	2.5791	28 43 11.5	0.603
17	3 58 32.50	2.3018	25 10 51.3	7.977	17	5 56 30.65	2.5826	28 43 42.2	0.420
18	4 0 50.83	2.3091	25 18 46.1	7.850	18	5 59 5.71	2.5860	28 44 1.9	0.236
19	4 3 9.59	2.3163	25 26 33.3	7.722	19	6 1 40.97	2.5892	28 44 10.5	+0.052
20	4 5 28.79	2.3235	25 34 12.8	7.593	20	6 4 16.41	2.5922	28 44 8.1	−0.133
21	4 7 48.42	2.3307	25 41 44.5	7.462	21	6 6 52.03	2.5951	28 43 54.5	0.320
22	4 10 8.47	2.3377	25 49 8.3	7.330	22	6 9 27.82	2.5978	28 43 29.7	0.506
23	4 12 28.95	2.3449	N.25 56 24.1	7.197	23	6 12 3.77	2.6004	N.28 42 53.8	0.693
	FRIDAY 14.					SUNDAY 16.			
0	4 14 49.86	2.3520	N.26 3 31.9	7.062	0	6 14 39.87	2.6028	N.28 42 6.6	0.881
1	4 17 11.19	2.3591	26 10 31.5	6.925	1	6 17 16.11	2.6052	28 41 8.1	1.068
2	4 19 32.95	2.3662	26 17 22.9	6.787	2	6 19 52.49	2.6074	28 39 58.4	1.257
3	4 21 55.13	2.3731	26 24 5.9	6.647	3	6 22 29.00	2.6094	28 38 37.3	1.446
4	4 24 17.72	2.3800	26 30 40.6	6.507	4	6 25 5.62	2.6112	28 37 4.9	1.636
5	4 26 40.73	2.3870	26 37 6.7	6.364	5	6 27 42.34	2.6128	28 35 21.0	1.826
6	4 29 4.16	2.3938	26 43 24.3	6.222	6	6 30 19.16	2.6144	28 33 25.8	2.015
7	4 31 27.99	2.4006	26 49 33.3	6.077	7	6 32 56.07	2.6159	28 31 19.2	2.206
8	4 33 52.23	2.4074	26 55 33.5	5.930	8	6 35 33.07	2.6172	28 29 1.1	2.397
9	4 36 16.88	2.4141	27 1 24.9	5.782	9	6 38 10.13	2.6182	28 26 31.6	2.587
10	4 38 41.92	2.4207	27 7 7.4	5.633	10	6 40 47.25	2.6192	28 23 50.6	2.778
11	4 41 7.36	2.4273	27 12 40.9	5.483	11	6 43 24.43	2.6200	28 20 58.2	2.969
12	4 43 33.20	2.4339	27 18 5.4	5.332	12	6 46 1.65	2.6206	28 17 54.3	3.161
13	4 45 59.43	2.4403	27 23 20.7	5.178	13	6 48 38.90	2.6211	28 14 38.9	3.352
14	4 48 26.04	2.4467	27 28 26.8	5.024	14	6 51 16.18	2.6214	28 11 12.0	3.544
15	4 50 53.03	2.4530	27 33 23.6	4.869	15	6 53 53.47	2.6216	28 7 33.6	3.736
16	4 53 20.40	2.4593	27 38 11.1	4.712	16	6 56 30.77	2.6216	28 3 43.7	3.928
17	4 55 48.15	2.4655	27 42 49.1	4.553	17	6 59 8.06	2.6215	27 59 42.3	4.119
18	4 58 16.26	2.4715	27 47 17.5	4.394	18	7 1 45.35	2.6212	27 55 29.4	4.310
19	5 0 44.73	2.4775	27 51 36.4	4.234	19	7 4 22.61	2.6207	27 51 5.1	4.501
20	5 3 13.56	2.4835	27 55 45.6	4.072	20	7 6 59.84	2.6202	27 46 29.3	4.692
21	5 5 42.75	2.4893	27 59 45.0	3.908	21	7 9 37.03	2.6195	27 41 42.1	4.882
22	5 8 12.28	2.4950	28 3 34.6	3.744	22	7 12 14.18	2.6187	27 36 43.4	5.073
23	5 10 42.15	2.5006	28 7 14.3	3.579	23	7 14 51.27	2.6177	27 31 33.3	5.262
24	5 13 12.35	2.5061	N.28 10 44.1	3.412	24	7 17 28.30	2.6165	N.27 26 11.8	5.453

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 17.					WEDNESDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	7 17 28.30	2.6165	N.27 26 11.8	5.453	0	9 19 37.81	2.4438	N.19 40 18.2	13.514
1	7 20 5.25	2.6152	27 20 38.9	5.643	1	9 22 4.30	2.4390	19 26 43.3	13.648
2	7 22 42.12	2.6138	27 14 54.6	5.832	2	9 24 30.49	2.4341	19 13 0.4	13.781
3	7 25 18.91	2.6122	27 8 59.0	6.021	3	9 26 56.39	2.4292	18 59 9.6	13.912
4	7 27 55.60	2.6106	27 2 52.1	6.209	4	9 29 22.00	2.4244	18 45 11.0	14.040
5	7 30 32.18	2.6087	26 56 33.9	6.397	5	9 31 47.32	2.4195	18 31 4.8	14.167
6	7 33 8.65	2.6068	26 50 4.4	6.584	6	9 34 12.34	2.4147	18 16 51.0	14.292
7	7 35 45.00	2.6047	26 43 23.8	6.770	7	9 36 37.08	2.4099	18 2 29.7	14.416
8	7 38 21.22	2.6025	26 36 32.0	6.957	8	9 39 1.53	2.4050	17 48 1.1	14.537
9	7 40 57.30	2.6002	26 29 29.0	7.142	9	9 41 25.68	2.4002	17 33 25.2	14.657
10	7 43 33.24	2.5977	26 22 15.0	7.326	10	9 43 49.55	2.3954	17 18 42.3	14.774
11	7 46 9.03	2.5952	26 14 49.9	7.510	11	9 46 13.13	2.3907	17 3 52.3	14.891
12	7 48 44.67	2.5926	26 7 13.8	7.693	12	9 48 36.43	2.3859	16 48 55.4	15.005
13	7 51 20.14	2.5897	25 59 26.7	7.876	13	9 50 59.44	2.3812	16 33 51.7	15.117
14	7 53 55.44	2.5868	25 51 28.7	8.057	14	9 53 22.17	2.3765	16 18 41.4	15.227
15	7 56 30.56	2.5838	25 43 19.9	8.237	15	9 55 44.62	2.3718	16 3 24.5	15.335
16	7 59 5.50	2.5807	25 35 0.2	8.417	16	9 58 6.79	2.3672	15 48 1.2	15.441
17	8 1 40.25	2.5775	25 26 29.8	8.596	17	10 0 28.68	2.3626	15 32 31.6	15.545
18	8 4 14.80	2.5742	25 17 48.7	8.773	18	10 2 50.30	2.3580	15 16 55.8	15.647
19	8 6 49.15	2.5708	25 8 57.0	8.950	19	10 5 11.64	2.3535	15 1 13.9	15.747
20	8 9 23.30	2.5673	24 59 54.7	9.126	20	10 7 32.72	2.3491	14 45 26.1	15.846
21	8 11 57.23	2.5637	24 50 41.9	9.301	21	10 9 53.53	2.3446	14 29 32.4	15.942
22	8 14 30.95	2.5601	24 41 18.6	9.475	22	10 12 14.07	2.3402	14 13 33.0	16.037
23	8 17 4.44	2.5563	N.24 31 44.9	9.647	23	10 14 34.35	2.3358	N.13 57 28.0	16.129
	TUESDAY 18.					THURSDAY 20.			
0	8 19 37.70	2.5524	N.24 22 1.0	9.817	0	10 16 54.37	2.3315	N.13 41 17.5	16.220
1	8 22 10.73	2.5485	24 12 6.8	9.988	1	10 19 14.13	2.3272	13 25 1.6	16.308
2	8 24 43.52	2.5444	24 2 2.4	10.157	2	10 21 33.64	2.3231	13 8 40.5	16.394
3	8 27 16.06	2.5403	23 51 47.9	10.325	3	10 23 52.90	2.3189	12 52 14.3	16.478
4	8 29 48.36	2.5362	23 41 23.4	10.491	4	10 26 11.91	2.3148	12 35 43.1	16.560
5	8 32 20.41	2.5320	23 30 49.0	10.656	5	10 28 30.68	2.3107	12 19 7.1	16.640
6	8 34 52.20	2.5277	23 20 4.7	10.820	6	10 30 49.20	2.3067	12 2 26.3	16.719
7	8 37 23.74	2.5235	23 9 10.6	10.982	7	10 33 7.49	2.3028	11 45 40.8	16.795
8	8 39 55.02	2.5191	22 58 6.8	11.144	8	10 35 25.54	2.2989	11 28 50.9	16.868
9	8 42 26.03	2.5146	22 46 53.3	11.304	9	10 37 43.36	2.2952	11 11 56.6	16.941
10	8 44 56.77	2.5102	22 35 30.3	11.462	10	10 40 0.96	2.2914	10 54 58.0	17.010
11	8 47 27.25	2.5057	22 23 57.9	11.618	11	10 42 18.33	2.2877	10 37 55.4	17.077
12	8 49 57.45	2.5010	22 12 16.1	11.774	12	10 44 35.48	2.2841	10 20 48.7	17.144
13	8 52 27.37	2.4964	22 0 25.0	11.927	13	10 46 52.42	2.2806	10 3 38.1	17.207
14	8 54 57.02	2.4918	21 48 24.8	12.079	14	10 49 9.15	2.2771	9 46 23.8	17.269
15	8 57 26.39	2.4871	21 36 15.5	12.230	15	10 51 25.67	2.2736	9 29 5.8	17.329
16	8 59 55.47	2.4823	21 23 57.2	12.379	16	10 53 41.98	2.2702	9 11 44.3	17.386
17	9 2 24.27	2.4777	21 11 30.0	12.527	17	10 55 58.10	2.2670	8 54 19.5	17.441
18	9 4 52.79	2.4729	20 58 54.0	12.673	18	10 58 14.02	2.2637	8 36 51.4	17.494
19	9 7 21.02	2.4681	20 46 9.2	12.817	19	11 0 29.75	2.2606	8 19 20.2	17.545
20	9 9 48.96	2.4632	20 33 15.8	12.961	20	11 2 45.29	2.2575	8 1 46.0	17.594
21	9 12 16.61	2.4584	20 20 13.9	13.102	21	11 5 0.65	2.2546	7 44 8.9	17.642
22	9 14 43.97	2.4536	20 7 3.6	13.241	22	11 7 15.84	2.2517	7 26 29.0	17.687
23	9 17 11.04	2.4487	19 53 45.0	13.378	23	11 9 30.85	2.2488	7 8 46.5	17.728
24	9 19 37.81	2.4438	N.19 40 18.2	13.514	24	11 11 45.69	2.2460	N. 6 51 1.6	17.769

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 21.					SUNDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	11 11 45.69	2.2460	N. 6 51 1.6	17.769	0	12 57 52.79	2.2061	S. 7 29 30.9	17.318
1	11 14 0.37	2.2433	6 33 14.2	17.808	1	13 0 5.19	2.2072	7 46 48.3	17.262
2	11 16 14.89	2.2407	6 15 24.6	17.844	2	13 2 17.65	2.2083	8 4 2.3	17.203
3	11 18 29.25	2.2381	5 57 32.9	17.878	3	13 4 30.19	2.2096	8 21 12.6	17.142
4	11 20 43.46	2.2357	5 39 39.2	17.911	4	13 6 42.80	2.2108	8 38 19.3	17.080
5	11 22 57.53	2.2332	5 21 43.6	17.941	5	13 8 55.48	2.2121	8 55 22.2	17.016
6	11 25 11.45	2.2309	5 3 46.3	17.968	6	13 11 8.25	2.2135	9 12 21.2	16.950
7	11 27 25.24	2.2287	4 45 47.4	17.994	7	13 13 21.10	2.2149	9 29 16.2	16.882
8	11 29 38.90	2.2266	4 27 47.0	18.018	8	13 15 34.04	2.2164	9 46 7.0	16.812
9	11 31 52.43	2.2245	4 9 45.2	18.040	9	13 17 47.07	2.2180	10 2 53.6	16.741
10	11 34 5.84	2.2225	3 51 42.2	18.060	10	13 20 0.20	2.2197	10 19 35.9	16.668
11	11 36 19.13	2.2206	3 33 38.1	18.077	11	13 22 13.43	2.2214	10 36 13.8	16.594
12	11 38 32.31	2.2187	3 15 32.9	18.093	12	13 24 26.77	2.2232	10 52 47.2	16.517
13	11 40 45.38	2.2170	2 57 26.8	18.107	13	13 26 40.21	2.2250	11 9 15.9	16.439
14	11 42 58.35	2.2153	2 39 20.0	18.118	14	13 28 53.77	2.2269	11 25 39.9	16.360
15	11 45 11.22	2.2137	2 21 12.6	18.127	15	13 31 7.44	2.2287	11 41 59.1	16.279
16	11 47 24.00	2.2122	2 3 4.7	18.135	16	13 33 21.22	2.2307	11 58 13.4	16.196
17	11 49 36.69	2.2108	1 44 56.4	18.140	17	13 35 35.13	2.2328	12 14 22.6	16.111
18	11 51 49.30	2.2095	1 26 47.9	18.143	18	13 37 49.16	2.2349	12 30 26.7	16.025
19	11 54 1.83	2.2082	1 8 39.2	18.145	19	13 40 3.32	2.2371	12 46 25.6	15.937
20	11 56 14.29	2.2071	0 50 30.5	18.144	20	13 42 17.61	2.2393	13 2 19.2	15.847
21	11 58 26.68	2.2059	0 32 21.9	18.141	21	13 44 32.04	2.2416	13 18 7.3	15.757
22	12 0 39.00	2.2049	N. 0 14 13.6	18.136	22	13 46 46.60	2.2438	13 33 50.0	15.665
23	12 2 51.27	2.2040	S. 0 3 54.4	18.129	23	13 49 1.30	2.2462	S. 13 49 27.1	15.570
	SATURDAY 22.					MONDAY 24.			
0	12 5 3.48	2.2031	S. 0 22 1.9	18.120	0	13 51 16.14	2.2485	S. 14 4 58.4	15.473
1	12 7 15.64	2.2023	0 40 8.8	18.109	1	13 53 31.12	2.2510	14 20 23.9	15.377
2	12 9 27.76	2.2017	0 58 15.0	18.097	2	13 55 46.26	2.2535	14 35 43.6	15.278
3	12 11 39.84	2.2010	1 16 20.4	18.082	3	13 58 1.54	2.2560	14 50 57.3	15.177
4	12 13 51.88	2.2005	1 34 24.8	18.064	4	14 0 16.98	2.2586	15 6 4.9	15.076
5	12 16 3.90	2.2001	1 52 28.1	18.045	5	14 2 32.57	2.2611	15 21 6.4	14.972
6	12 18 15.89	2.1997	2 10 30.2	18.024	6	14 4 48.31	2.2637	15 36 1.6	14.867
7	12 20 27.86	2.1993	2 28 31.0	18.002	7	14 7 4.21	2.2663	15 50 50.5	14.762
8	12 22 39.81	2.1991	2 46 30.4	17.977	8	14 9 20.27	2.2690	16 5 33.0	14.654
9	12 24 51.75	2.1989	3 4 28.2	17.949	9	14 11 36.49	2.2717	16 20 9.0	14.545
10	12 27 3.68	2.1989	3 22 24.3	17.920	10	14 13 52.88	2.2745	16 34 38.4	14.434
11	12 29 15.62	2.1990	3 40 18.6	17.890	11	14 16 9.43	2.2772	16 49 1.1	14.322
12	12 31 27.56	2.1991	3 58 11.1	17.857	12	14 18 26.15	2.2801	17 3 17.1	14.209
13	12 33 39.51	2.1992	4 16 1.5	17.822	13	14 20 43.04	2.2828	17 17 26.2	14.094
14	12 35 51.47	2.1995	4 33 49.8	17.787	14	14 23 0.09	2.2857	17 31 28.4	13.979
15	12 38 3.45	2.1998	4 51 35.9	17.748	15	14 25 17.32	2.2886	17 45 23.7	13.862
16	12 40 15.45	2.2002	5 9 19.6	17.707	16	14 27 34.72	2.2914	17 59 11.8	13.742
17	12 42 27.48	2.2007	5 27 0.8	17.666	17	14 29 52.29	2.2943	18 12 52.8	13.622
18	12 44 39.54	2.2012	5 44 39.5	17.623	18	14 32 10.04	2.2972	18 26 26.5	13.502
19	12 46 51.63	2.2019	6 2 15.5	17.576	19	14 34 27.96	2.3002	18 39 53.0	13.379
20	12 49 3.77	2.2027	6 19 48.6	17.527	20	14 36 46.06	2.3031	18 53 12.0	13.255
21	12 51 15.95	2.2034	6 37 18.8	17.478	21	14 39 4.33	2.3060	19 6 23.6	13.131
22	12 53 28.18	2.2042	6 54 46.0	17.427	22	14 41 22.78	2.3089	19 19 27.7	13.004
23	12 55 40.46	2.2051	7 12 10.1	17.374	23	14 43 41.40	2.3118	19 32 24.1	12.877
24	12 57 52.79	2.2061	S. 7 29 30.9	17.318	24	14 46 0.20	2.3148	S. 19 45 12.9	12.748

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 25.					THURSDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	14 46 0.20	2.3148	S.19 45 12.9	12.748	0	16 40 3.71	2.4188	S.27 10 35.0	5.535
1	14 48 19.18	2.3177	19 57 53.9	12.618	1	16 42 28.86	2.4194	27 16 2.2	5.372
2	14 50 38.33	2.3207	20 10 27.1	12.487	2	16 44 54.04	2.4199	27 21 19.6	5.207
3	14 52 57.66	2.3237	20 22 52.3	12.354	3	16 47 19.25	2.4203	27 26 27.1	5.043
4	14 55 17.17	2.3267	20 35 9.6	12.222	4	16 49 44.48	2.4206	27 31 24.8	4.880
5	14 57 36.86	2.3296	20 47 18.9	12.087	5	16 52 9.72	2.4208	27 36 12.7	4.717
6	14 59 56.72	2.3324	20 59 20.0	11.951	6	16 54 34.97	2.4209	27 40 50.8	4.553
7	15 2 16.75	2.3353	21 11 13.0	11.815	7	16 57 0.23	2.4210	27 45 19.0	4.388
8	15 4 36.96	2.3382	21 22 57.8	11.677	8	16 59 25.49	2.4209	27 49 37.4	4.225
9	15 6 57.34	2.3412	21 34 34.3	11.539	9	17 1 50.74	2.4207	27 53 46.0	4.061
10	15 9 17.90	2.3441	21 46 2.5	11.399	10	17 4 15.98	2.4205	27 57 44.7	3.897
11	15 11 38.63	2.3468	21 57 22.2	11.258	11	17 6 41.20	2.4201	28 1 33.6	3.732
12	15 13 59.53	2.3497	22 8 33.5	11.117	12	17 9 6.39	2.4196	28 5 12.6	3.568
13	15 16 20.59	2.3525	22 19 36.2	10.974	13	17 11 31.55	2.4191	28 8 41.8	3.405
14	15 18 41.82	2.3552	22 30 30.4	10.832	14	17 13 56.68	2.4184	28 12 1.2	3.241
15	15 21 3.22	2.3580	22 41 16.0	10.687	15	17 16 21.76	2.4176	28 15 10.7	3.077
16	15 23 24.78	2.3607	22 51 52.8	10.541	16	17 18 46.79	2.4167	28 18 10.4	2.914
17	15 25 46.50	2.3633	23 2 20.9	10.394	17	17 21 11.77	2.4157	28 21 0.4	2.752
18	15 28 8.38	2.3659	23 12 40.1	10.247	18	17 23 36.68	2.4147	28 23 40.6	2.588
19	15 30 30.42	2.3686	23 22 50.5	10.099	19	17 26 1.53	2.4136	28 26 11.0	2.425
20	15 32 52.61	2.3712	23 32 52.0	9.951	20	17 28 26.31	2.4122	28 28 31.6	2.262
21	15 35 14.95	2.3736	23 42 44.6	9.801	21	17 30 51.00	2.4108	28 30 42.4	2.100
22	15 37 37.44	2.3761	23 52 28.1	9.650	22	17 33 15.61	2.4093	28 32 43.6	1.938
23	15 40 0.08	2.3786	S.24 2 2.6	9.499	23	17 35 40.13	2.4078	S.28 34 35.0	1.776
	WEDNESDAY 26.					FRIDAY 28.			
0	15 42 22.87	2.3810	S.24 11 28.0	9.347	0	17 38 4.55	2.4062	S.28 36 16.7	1.614
1	15 44 45.80	2.3833	24 20 44.2	9.194	1	17 40 28.87	2.4044	28 37 48.7	1.452
2	15 47 8.87	2.3856	24 29 51.3	9.042	2	17 42 53.08	2.4025	28 39 11.0	1.292
3	15 49 32.07	2.3877	24 38 49.2	8.888	3	17 45 17.17	2.4005	28 40 23.8	1.132
4	15 51 55.40	2.3899	24 47 37.8	8.732	4	17 47 41.14	2.3984	28 41 26.9	0.972
5	15 54 18.86	2.3921	24 56 17.1	8.577	5	17 50 4.98	2.3962	28 42 20.4	0.812
6	15 56 42.45	2.3942	25 4 47.0	8.421	6	17 52 28.69	2.3940	28 43 4.4	0.654
7	15 59 6.16	2.3962	25 13 7.6	8.265	7	17 54 52.26	2.3916	28 43 38.9	0.495
8	16 1 29.99	2.3981	25 21 18.8	8.107	8	17 57 15.68	2.3892	28 44 3.8	0.337
9	16 3 53.93	2.3999	25 29 20.5	7.950	9	17 59 38.96	2.3867	28 44 19.3	0.179
10	16 6 17.98	2.4017	25 37 12.8	7.792	10	18 2 2.08	2.3839	28 44 25.3	−0.022
11	16 8 42.14	2.4034	25 44 55.6	7.633	11	18 4 25.03	2.3812	28 44 21.9	+0.134
12	16 11 6.39	2.4050	25 52 28.8	7.474	12	18 6 47.82	2.3783	28 44 9.2	0.290
13	16 13 30.74	2.4067	25 59 52.5	7.315	13	18 9 10.43	2.3754	28 43 47.1	0.446
14	16 15 55.19	2.4082	26 7 6.6	7.154	14	18 11 32.87	2.3724	28 43 15.7	0.601
15	16 18 19.73	2.4096	26 14 11.0	6.993	15	18 13 55.12	2.3692	28 42 35.0	0.755
16	16 20 44.35	2.4109	26 21 5.8	6.833	16	18 16 17.18	2.3660	28 41 45.1	0.908
17	16 23 9.04	2.4122	26 27 51.0	6.672	17	18 18 39.04	2.3627	28 40 46.0	1.062
18	16 25 33.81	2.4134	26 34 26.5	6.511	18	18 21 0.70	2.3593	28 39 37.7	1.213
19	16 27 58.65	2.4145	26 40 52.3	6.348	19	18 23 22.16	2.3559	28 38 20.4	1.365
20	16 30 23.55	2.4155	26 47 8.3	6.186	20	18 25 43.41	2.3523	28 36 53.9	1.517
21	16 32 48.51	2.4165	26 53 14.6	6.024	21	18 28 4.44	2.3487	28 35 18.4	1.667
22	16 35 13.53	2.4174	26 59 11.2	5.862	22	18 30 25.25	2.3450	28 33 33.9	1.817
23	16 37 38.60	2.4182	27 4 58.0	5.698	23	18 32 45.84	2.3412	28 31 40.4	1.966
24	16 40 3.71	2.4188	S.27 10 35.0	5.535	24	18 35 6.20	2.3373	S.28 29 38.0	2.113

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 29.			
	h m s	s	° ′ ″	″
0	18 35 6.20	2.3373	S. 28 29 38.0	2.113
1	18 37 26.32	2.3334	28 27 26.8	2.261
2	18 39 46.21	2.3294	28 25 6.7	2.407
3	18 42 5.85	2.3252	28 22 37.9	2.553
4	18 44 25.24	2.3211	28 20 0.3	2.699
5	18 46 44.38	2.3169	28 17 14.0	2.843
6	18 49 3.27	2.3127	28 14 19.1	2.987
7	18 51 21.90	2.3083	28 11 15.6	3.129
8	18 53 40.27	2.3038	28 8 3.6	3.271
9	18 55 58.36	2.2992	28 4 43.1	3.412
10	18 58 16.18	2.2947	28 1 14.1	3.553
11	19 0 33.73	2.2902	27 57 36.7	3.692
12	19 2 51.00	2.2855	27 53 51.1	3.829
13	19 5 7.99	2.2807	27 49 57.2	3.967
14	19 7 24.69	2.2760	27 45 55.0	4.104
15	19 9 41.11	2.2712	27 41 44.7	4.240
16	19 11 57.24	2.2663	27 37 26.2	4.375
17	19 14 13.07	2.2614	27 32 59.7	4.508
18	19 16 28.61	2.2564	27 28 25.2	4.642
19	19 18 43.84	2.2514	27 23 42.7	4.774
20	19 20 58.78	2.2464	27 18 52.3	4.906
21	19 23 13.41	2.2412	27 13 54.0	5.036
22	19 25 27.73	2.2362	27 8 48.0	5.165
23	19 27 41.75	2.2310	S. 27 3 34.2	5.294
	SUNDAY 30.			
0	19 29 55.45	2.2257	S. 26 58 12.7	5.422
1	19 32 8.84	2.2206	26 52 43.6	5.548
2	19 34 21.92	2.2153	26 47 6.9	5.673
3	19 36 34.68	2.2100	26 41 22.7	5.797
4	19 38 47.12	2.2047	26 35 31.1	5.922
5	19 40 59.24	2.1993	26 29 32.1	6.045
6	19 43 11.04	2.1940	26 23 25.8	6.166
7	19 45 22.52	2.1886	26 17 12.2	6.287
8	19 47 33.67	2.1832	26 10 51.3	6.407
9	19 49 44.50	2.1777	26 4 23.3	6.526
10	19 51 55.00	2.1723	25 57 48.2	6.644
11	19 54 5.18	2.1669	25 51 6.0	6.762
12	19 56 15.03	2.1614	25 44 16.8	6.877
13	19 58 24.55	2.1559	25 37 20.7	6.992
14	20 0 33.74	2.1505	25 30 17.8	7.105
15	20 2 42.61	2.1450	25 23 8.1	7.218
16	20 4 51.14	2.1394	25 15 51.6	7.331
17	20 6 59.34	2.1340	25 8 28.4	7.442
18	20 9 7.22	2.1286	25 0 58.6	7.552
19	20 11 14.77	2.1230	24 53 22.2	7.661
20	20 13 21.98	2.1176	24 45 39.3	7.769
21	20 15 28.87	2.1120	24 37 49.9	7.877
22	20 17 35.42	2.1065	24 29 54.1	7.982
23	20 19 41.65	2.1011	24 21 52.0	8.087
24	20 21 47.55	2.0956	S. 24 13 43.6	8.192

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 31.			
	h m s	s	° ′ ″	″
0	20 21 47.55	2.0956	S. 24 13 43.6	8.192
1	20 23 53.12	2.0901	24 5 29.0	8.295
2	20 25 58.36	2.0847	23 57 8.2	8.397
3	20 28 3.28	2.0792	23 48 41.3	8.499
4	20 30 7.87	2.0738	23 40 8.3	8.599
5	20 32 12.14	2.0684	23 31 29.4	8.698
6	20 34 16.08	2.0630	23 22 44.5	8.797
7	20 36 19.70	2.0577	23 13 53.8	8.894
8	20 38 23.00	2.0522	23 4 57.2	8.991
9	20 40 25.97	2.0469	22 55 54.9	9.086
10	20 42 28.63	2.0417	22 46 46.9	9.181
11	20 44 30.97	2.0363	22 37 33.2	9.275
12	20 46 32.99	2.0311	22 28 13.9	9.367
13	20 48 34.70	2.0258	22 18 49.1	9.459
14	20 50 36.09	2.0206	22 9 18.8	9.550
15	20 52 37.17	2.0154	21 59 43.1	9.640
16	20 54 37.94	2.0102	21 50 2.0	9.728
17	20 56 38.40	2.0052	21 40 15.6	9.817
18	20 58 38.56	2.0001	21 30 24.0	9.904
19	21 0 38.41	1.9950	21 20 27.2	9.989
20	21 2 37.96	1.9900	21 10 25.3	10.075
21	21 4 37.21	1.9850	21 0 18.2	10.160
22	21 6 36.16	1.9800	20 50 6.1	10.243
23	21 8 34.81	1.9751	S. 20 39 49.0	10.325
	TUESDAY, APRIL 1.			
0	21 10 33.17	1.9702	S. 20 29 27.1	10.406

PHASES OF THE MOON.

			d	h	m
●	New Moon . . .	Mar.	7	12	22.5
☽	First Quarter		15	8	58.0
○	Full Moon		21	23	56.2
☾	Last Quarter		29	0	57.7

			d	h
☾	Apogee	Mar.	5	20.6
☾	Perigee		20	23.6

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.	Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to / Subtracted from Apparent Time.	Diff. for 1 Hour.
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Tues.	1	0 41 2.02	9.100	N. 4 25 4.5	+57.93	16 1.81	64.47	4 4.21	0.754
Wed.	2	0 44 40.50	9.105	4 48 12.5	57.72	16 1.53	64.49	3 46.18	0.749
Thur.	3	0 48 19.11	9.111	5 11 15.4	57.50	16 1.25	64.51	3 28.28	0.743
Fri.	4	0 51 57.87	9.118	5 34 12.9	+57.27	16 0.97	64.53	3 10.53	0.736
Sat.	5	0 55 36.80	9.126	5 57 4.7	57.02	16 0.69	64.55	2 52.95	0.729
SUN.	6	0 59 15.90	9.134	6 19 50.4	56.76	16 0.41	64.58	2 35.55	0.721
Mon.	7	1 2 55.20	9.142	6 42 29.5	+56.48	16 0.13	64.61	2 18.34	0.712
Tues.	8	1 6 34.72	9.151	7 5 1.7	56.19	15 59.86	64.65	2 1.35	0.703
Wed.	9	1 10 14.47	9.161	7 27 26.6	55.88	15 59.59	64.69	1 44.59	0.693
Thur.	10	1 13 54.45	9.171	7 49 43.9	+55.56	15 59.32	64.73	1 28.07	0.683
Fri.	11	1 17 34.68	9.182	8 11 53.3	55.22	15 59.06	64.77	1 11.80	0.672
Sat.	12	1 21 15.18	9.193	8 33 54.3	54.86	15 58.79	64.81	0 55.79	0.661
SUN.	13	1 24 55.97	9.206	8 55 46.6	+54.49	15 58.53	64.85	0 40.06	0.649
Mon.	14	1 28 37.06	9.219	9 17 29.8	54.11	15 58.26	64.90	0 24.63	0.636
Tues.	15	1 32 18.46	9.233	9 39 3.7	53.71	15 58.00	64.95	0 9.52	0.623
Wed.	16	1 36 0.19	9.247	10 0 27.9	+53.30	15 57.74	65.00	0 5.26	0.609
Thur.	17	1 39 42.27	9.261	10 21 42.1	52.87	15 57.48	65.05	0 19.69	0.594
Fri.	18	1 43 24.71	9.277	10 42 45.9	52.44	15 57.22	65.11	0 33.76	0.579
Sat.	19	1 47 7.53	9.293	11 3 39.1	+51.99	15 56.96	65.17	0 47.46	0.563
SUN.	20	1 50 50.76	9.310	11 24 21.4	51.53	15 56.70	65.23	1 0.76	0.545
Mon.	21	1 54 34.41	9.328	11 44 52.5	51.05	15 56.44	65.29	1 13.64	0.527
Tues.	22	1 58 18.49	9.346	12 5 12.1	+50.56	15 56.18	65.36	1 26.08	0.509
Wed.	23	2 2 3.02	9.365	12 25 19.8	50.07	15 55.92	65.43	1 38.07	0.490
Thur.	24	2 5 48.02	9.385	12 45 15.4	49.56	15 55.66	65.49	1 49.60	0.470
Fri.	25	2 9 33.50	9.405	13 4 58.5	+49.03	15 55.41	65.56	2 0.64	0.450
Sat.	26	2 13 19.47	9.426	13 24 28.9	48.50	15 55.15	65.63	2 11.18	0.429
SUN.	27	2 17 5.95	9.447	13 43 46.3	47.95	15 54.90	65.70	2 21.22	0.408
Mon.	28	2 20 52.96	9.469	14 2 50.2	+47.38	15 54.65	65.77	2 30.75	0.386
Tues.	29	2 24 40.50	9.492	14 21 40.3	46.80	15 54.40	65.84	2 39.75	0.364
Wed.	30	2 28 28.57	9.515	14 40 16.4	46.21	15 54.15	65.92	2 48.21	0.341
Thur.	31	2 32 17.18	9.538	N. 14 58 38.2	+45.60	15 53.90	66.00	2 56.13	0.319

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0ˢ.18 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Equation of Time to be Subtracted from / Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ′ ″	″	m s	s	h m s
Tues.	1	0 41 1.41	9.102	N. 4 25 0.5	+57.95	4 4.25	0.754	0 36 57.15
Wed.	2	0 44 39.93	9.107	4 48 8.9	57.74	3 46.22	0.749	0 40 53.71
Thur.	3	0 48 18.58	9.113	5 11 12.2	57.52	3 28.32	0.743	0 44 50.26
Fri.	4	0 51 57.39	9.120	5 34 10.0	+57.29	3 10.57	0.736	0 48 46.81
Sat.	5	0 55 36.36	9.127	5 57 2.0	57.04	2 52.99	0.729	0 52 43.37
SUN.	6	0 59 15.51	9.135	6 19 47.9	56.78	2 35.59	0.721	0 56 39.92
Mon.	7	1 2 54.85	9.144	6 42 27.3	+56.50	2 18.38	0.712	1 0 36.48
Tues.	8	1 6 34.41	9.153	7 4 59.8	56.20	2 1.38	0.703	1 4 33.03
Wed.	9	1 10 14.20	9.163	7 27 25.0	55.89	1 44.61	0.693	1 8 29.58
Thur.	10	1 13 54.22	9.173	7 49 42.6	+55.57	1 28.08	0.683	1 12 26.14
Fri.	11	1 17 34.50	9.184	8 11 52.2	55.23	1 11.81	0.672	1 16 22.69
Sat.	12	1 21 15.04	9.195	8 33 53.5	54.87	0 55.80	0.661	1 20 19.25
SUN.	13	1 24 55.87	9.207	8 55 46.0	+54.50	0 40.07	0.649	1 24 15.80
Mon.	14	1 28 37.00	9.220	9 17 29.5	54.12	0 24.64	0.636	1 28 12.36
Tues.	15	1 32 18.44	9.234	9 39 3.6	53.72	0 9.53	0.623	1 32 8.91
Wed.	16	1 36 0.21	9.248	10 0 28.0	+53.31	0 5.25	0.609	1 36 5.46
Thur.	17	1 39 42.33	9.262	10 21 42.4	52.88	0 19.69	0.594	1 40 2.02
Fri.	18	1 43 24.80	9.278	10 42 46.4	52.45	0 33.77	0.579	1 43 58.58
Sat.	19	1 47 7.66	9.294	11 3 39.8	+52.00	0 47.47	0.563	1 47 55.13
SUN.	20	1 50 50.92	9.311	11 24 22.3	51.54	1 0.76	0.545	1 51 51.68
Mon.	21	1 54 34.60	9.329	11 44 53.6	51.06	1 13.64	0.527	1 55 48.24
Tues.	22	1 58 18.71	9.347	12 5 13.3	+50.57	1 26.09	0.509	1 59 44.80
Wed.	23	2 2 3.27	9.366	12 25 21.2	50.08	1 38.08	0.490	2 3 41.35
Thur.	24	2 5 48.30	9.386	12 45 16.9	49.57	1 49.61	0.470	2 7 37.90
Fri.	25	2 9 33.81	9.407	13 5 0.2	+49.04	2 0.65	0.450	2 11 34.46
Sat.	26	2 13 19.81	9.428	13 24 30.7	48.50	2 11.20	0.429	2 15 31.02
SUN.	27	2 17 6.32	9.449	13 43 48.2	47.95	2 21.24	0.408	2 19 27.57
Mon.	28	2 20 53.35	9.471	14 2 52.2	+47.38	2 30.77	0.386	2 23 24.13
Tues.	29	2 24 40.91	9.493	14 21 42.4	46.80	2 39.77	0.364	2 27 20.68
Wed.	30	2 28 29.01	9.515	14 40 18.6	46.21	2 48.23	0.341	2 31 17.24
Thur.	31	2 32 17.65	9.538	N. 14 58 40.4	+45.60	2 56.15	0.319	2 35 13.80

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 Hour
$+9^{s}.8565$.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S							Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.		
		True Longitude.					Diff. for 1 Hour.	Latitude.					
		λ			λ′								
		°	′	″	′	″	″	″			h	m	s
1	91	11	9	46.3	9	35.1	147.95	−0.46	9.999 8601	+53.2	23	19	12.99
2	92	12	8	56.3	8	44.9	147.88	0.36	9.999 9875	53.0	23	15	17.08
3	93	13	8	4.4	7	52.8	147.80	0.25	0.000 1145	52.8	23	11	21.18
4	94	14	7	10.6	6	58.9	147.72	−0.13	0.000 2410	+52.6	23	7	25.27
5	95	15	6	14.9	6	3.1	147.64	−0.01	0.000 3669	52.3	23	3	29.36
6	96	16	5	17.2	5	5.3	147.55	+0.11	0.000 4920	52.0	22	59	33.45
7	97	17	4	17.5	4	5.5	147.47	+0.24	0.000 6163	+51.6	22	55	37.54
8	98	18	3	15.7	3	3.6	147.38	0.36	0.000 7399	51.3	22	51	41.63
9	99	19	2	11.8	1	59.6	147.29	0.45	0.000 8626	51.0	22	47	45.73
10	100	20	1	5.7	0	53.4	147.20	+0.52	0.000 9845	+50.6	22	43	49.82
11	101	20	59	57.4	59	45.0	147.11	0.57	0.001 1056	50.3	22	39	53.91
12	102	21	58	46.9	58	34.4	147.01	0.59	0.001 2259	50.0	22	35	58.00
13	103	22	57	34.2	57	21.5	146.92	+0.57	0.001 3456	+49.8	22	32	2.09
14	104	23	56	19.2	56	6.3	146.82	0.52	0.001 4647	49.6	22	28	6.18
15	105	24	55	1.8	54	48.8	146.73	0.44	0.001 5833	49.4	22	24	10.28
16	106	25	53	42.1	53	29.0	146.64	+0.33	0.001 7016	+49.3	22	20	14.37
17	107	26	52	20.2	52	7.0	146.54	0.20	0.001 8197	49.2	22	16	18.46
18	108	27	50	56.2	50	42.9	146.45	+0.07	0.001 9376	49.1	22	12	22.55
19	109	28	49	30.1	49	16.6	146.37	−0.08	0.002 0555	+49.1	22	8	26.64
20	110	29	48	1.9	47	48.3	146.29	0.22	0.002 1733	49.0	22	4	30.73
21	111	30	46	31.8	46	18.1	146.21	0.34	0.002 2911	49.0	22	0	34.82
22	112	31	44	59.8	44	46.0	146.13	−0.45	0.002 4087	+48.9	21	56	38.91
23	113	32	43	26.0	43	12.1	146.06	0.53	0.002 5262	48.8	21	52	43.00
24	114	33	41	50.6	41	36.5	145.99	0.59	0.002 6434	48.7	21	48	47.10
25	115	34	40	13.6	39	59.3	145.92	−0.61	0.002 7602	+48.5	21	44	51.19
26	116	35	38	34.9	38	20.5	145.86	0.60	0.002 8764	48.2	21	40	55.28
27	117	36	36	54.7	36	40.2	145.79	0.57	0.002 9918	47.9	21	36	59.37
28	118	37	35	12.9	34	58.3	145.73	−0.51	0.003 1064	+47.5	21	33	3.46
29	119	38	33	29.6	33	14.8	145.66	0.42	0.003 2200	47.1	21	29	7.55
30	120	39	31	44.8	31	29.9	145.60	0.32	0.003 3325	46.6	21	25	11.64
31	121	40	29	58.4	29	43.4	145.54	−0.22	0.003 4438	+46.1	21	21	15.73

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ′ are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
$-9^{s}.8296$.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	14 46.8	14 45.6	54 8.88	−0.466	54 4.42	−0.281	21 10.9	1.76	24.5
2	14 45.0	14 44.9	54 2.12	−0.104	54 1.87	+0.060	21 52.1	1.68	25.5
3	14 45.4	14 46.3	54 3.52	+0.212	54 6.92	0.351	22 31.8	1.64	26.5
4	14 47.7	14 49.4	54 11.91	+0.478	54 18.34	+0.591	23 11.1	1.64	27.5
5	14 51.5	14 54.0	54 26.06	0.694	54 34.95	0.785	23 50.9	1.68	28.5
6	14 56.6	14 59.6	54 44.87	0.866	54 55.71	0.939	6	. .	29.5
7	15 2.8	15 6.2	55 7.39	+1.005	55 19.82	+1.064	0 32.3	1.77	0.8
8	15 9.8	15 13.5	55 32.93	1.119	55 46.68	1.172	1 16.3	1.91	1.8
9	15 17.4	15 21.5	56 1.03	1.222	56 15.97	1.270	2 4.0	2.07	2.8
10	15 25.7	15 30.1	56 31.50	+1.318	56 47.60	+1.364	2 55.9	2.25	3.8
11	15 34.6	15 39.3	57 4.24	1.408	57 21.38	1.446	3 51.9	2.40	4.8
12	15 44.1	15 49.0	57 38.93	1.477	57 56.80	1.499	4 50.8	2.49	5.8
13	15 53.9	15 58.8	58 14.86	+1.508	58 32.93	+1.501	5 50.7	2.49	6.8
14	16 3.7	16 8.4	58 50.79	1.471	59 8.12	1.412	6 49.5	2.40	7.8
15	16 12.9	16 17.0	59 24.56	1.324	59 39.77	1.206	7 45.7	2.28	8.8
16	16 20.7	16 23.9	59 53.36	+1.053	60 4.89	+0.863	8 39.0	2.17	9.8
17	16 26.3	16 28.0	60 13.92	0.638	60 20.07	+0.383	9 30.0	2.09	10.8
18	16 28.8	16 28.6	60 23.00	+0.103	60 22.47	−0.194	10 19.7	2.07	11.8
19	16 27.5	16 25.4	60 18.31	−0.498	60 10.51	−0.800	11 9.5	2.10	12.8
20	16 22.3	16 18.3	59 59.14	1.091	59 44.40	1.358	12 0.6	2.17	13.8
21	16 13.4	16 7.9	59 26.65	1.594	59 6.29	1.792	12 53.8	2.27	14.8
22	16 1.8	15 55.2	58 43.81	−1.947	58 19.74	−2.056	13 49.5	2.36	15.8
23	15 48.4	15 41.4	57 54.67	2.116	57 29.14	2.133	14 46.8	2.41	16.8
24	15 34.5	15 27.7	57 3.67	2.107	56 38.76	2.038	15 44.4	2.37	17.8
25	15 21.2	15 15.1	56 14.91	−1.933	55 52.48	−1.801	16 40.2	2.27	18.8
26	15 9.4	15 4.3	55 31.78	1.644	55 13.09	1.469	17 32.9	2.11	19.8
27	14 59.8	14 56.0	54 56.62	1.275	54 42.54	1.069	18 21.7	1.96	20.8
28	14 52.9	14 50.4	54 30.97	−0.858	54 21.94	−0.645	19 6.9	1.81	21.8
29	14 48.6	14 47.6	54 15.49	0.431	54 11.59	−0.220	19 49.0	1.71	22.8
30	14 47.2	14 47.5	54 10.18	−0.016	54 11.18	+0.179	20 29.2	1.65	23.8
31	14 48.4	14 49.8	54 14.48	+0.365	54 19.91	0.536	21 8.6	1.64	24.8
32	14 51.9	14 54.4	54 27.31	+0.695	54 36.51	+0.836	21 48.0	1.67	25.8

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 1.					THURSDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	21 10 33.17	1.9702	S. 20 29 27.1	10.406	0	22 40 24.07	1.7943	S. 10 52 13.8	13.329
1	21 12 31.24	1.9654	20 19 0.3	10.488	1	22 42 11.66	1.7920	10 38 52.8	13.371
2	21 14 29.02	1.9606	20 8 28.6	10.568	2	22 43 59.11	1.7898	10 25 29.3	13.412
3	21 16 26.51	1.9558	19 57 52.2	10.647	3	22 45 46.44	1.7877	10 12 3.3	13.452
4	21 18 23.72	1.9512	19 47 11.0	10.725	4	22 47 33.64	1.7857	9 58 35.0	13.491
5	21 20 20.65	1.9465	19 36 25.2	10.802	5	22 49 20.72	1.7837	9 45 4.4	13.529
6	21 22 17.30	1.9418	19 25 34.8	10.878	6	22 51 7.68	1.7817	9 31 31.5	13.567
7	21 24 13.67	1.9372	19 14 39.9	10.953	7	22 52 54.52	1.7798	9 17 56.3	13.604
8	21 26 9.77	1.9327	19 3 40.5	11.028	8	22 54 41.26	1.7781	9 4 19.0	13.640
9	21 28 5.60	1.9282	18 52 36.6	11.102	9	22 56 27.89	1.7763	8 50 39.5	13.676
10	21 30 1.15	1.9237	18 41 28.3	11.174	10	22 58 14.42	1.7746	8 36 57.9	13.711
11	21 31 56.44	1.9193	18 30 15.7	11.246	11	23 0 0.85	1.7730	8 23 14.2	13.745
12	21 33 51.47	1.9150	18 18 58.8	11.317	12	23 1 47.18	1.7715	8 9 28.5	13.778
13	21 35 46.24	1.9107	18 7 37.7	11.387	13	23 3 33.42	1.7700	7 55 40.9	13.810
14	21 37 40.75	1.9064	17 56 12.4	11.457	14	23 5 19.58	1.7687	7 41 51.3	13.842
15	21 39 35.01	1.9022	17 44 42.9	11.525	15	23 7 5.66	1.7673	7 27 59.8	13.873
16	21 41 29.02	1.8981	17 33 9.4	11.593	16	23 8 51.65	1.7659	7 14 6.5	13.903
17	21 43 22.78	1.8939	17 21 31.8	11.660	17	23 10 37.57	1.7647	7 0 11.4	13.933
18	21 45 16.29	1.8898	17 9 50.2	11.726	18	23 12 23.42	1.7637	6 46 14.5	13.962
19	21 47 9.56	1.8858	16 58 4.7	11.790	19	23 14 9.21	1.7626	6 32 16.0	13.989
20	21 49 2.59	1.8819	16 46 15.4	11.854	20	23 15 54.93	1.7615	6 18 15.8	14.017
21	21 50 55.39	1.8780	16 34 22.2	11.918	21	23 17 40.59	1.7605	6 4 14.0	14.043
22	21 52 47.95	1.8741	16 22 25.2	11.981	22	23 19 26.19	1.7596	5 50 10.6	14.069
23	21 54 40.28	1.8703	S. 16 10 24.5	12.043	23	23 21 11.74	1.7588	S. 5 36 5.7	14.094
	WEDNESDAY 2.					FRIDAY 4.			
0	21 56 32.39	1.8666	S. 15 58 20.1	12.103	0	23 22 57.25	1.7582	S. 5 21 59.3	14.118
1	21 58 24.27	1.8629	15 46 12.1	12.163	1	23 24 42.72	1.7574	5 7 51.5	14.142
2	22 0 15.94	1.8593	15 34 0.5	12.223	2	23 26 28.14	1.7568	4 53 42.3	14.164
3	22 2 7.39	1.8557	15 21 45.3	12.282	3	23 28 13.53	1.7562	4 39 31.8	14.186
4	22 3 58.62	1.8522	15 9 26.6	12.340	4	23 29 58.89	1.7557	4 25 20.0	14.207
5	22 5 49.65	1.8487	14 57 4.5	12.397	5	23 31 44.22	1.7553	4 11 6.9	14.228
6	22 7 40.47	1.8453	14 44 39.0	12.453	6	23 33 29.53	1.7550	3 56 52.6	14.248
7	22 9 31.09	1.8420	14 32 10.2	12.508	7	23 35 14.82	1.7547	3 42 37.1	14.267
8	22 11 21.51	1.8387	14 19 38.1	12.563	8	23 37 0.09	1.7545	3 28 20.6	14.284
9	22 13 11.73	1.8354	14 7 2.7	12.617	9	23 38 45.36	1.7543	3 14 3.0	14.302
10	22 15 1.76	1.8323	13 54 24.1	12.669	10	23 40 30.61	1.7542	2 59 44.3	14.319
11	22 16 51.61	1.8292	13 41 42.4	12.721	11	23 42 15.86	1.7542	2 45 24.7	14.335
12	22 18 41.27	1.8262	13 28 57.6	12.772	12	23 44 1.12	1.7543	2 31 4.1	14.350
13	22 20 30.75	1.8232	13 16 9.7	12.823	13	23 45 46.38	1.7544	2 16 42.7	14.364
14	22 22 20.05	1.8202	13 3 18.8	12.873	14	23 47 31.65	1.7547	2 2 20.4	14.378
15	22 24 9.17	1.8173	12 50 24.9	12.922	15	23 49 16.94	1.7549	1 47 57.3	14.391
16	22 25 58.13	1.8146	12 37 28.1	12.971	16	23 51 2.24	1.7553	1 33 33.5	14.403
17	22 27 46.92	1.8118	12 24 28.4	13.019	17	23 52 47.57	1.7557	1 19 9.0	14.414
18	22 29 35.54	1.8091	12 11 25.8	13.066	18	23 54 32.92	1.7561	1 4 43.8	14.425
19	22 31 24.00	1.8064	11 58 20.5	13.111	19	23 56 18.30	1.7567	0 50 18.0	14.434
20	22 33 12.31	1.8038	11 45 12.5	13.157	20	23 58 3.72	1.7573	0 35 51.7	14.443
21	22 35 0.47	1.8014	11 32 1.7	13.202	21	23 59 49.17	1.7579	0 21 24.8	14.452
22	22 36 48.48	1.7989	11 18 48.3	13.245	22	0 1 34.67	1.7587	S. 0 6 57.5	14.459
23	22 38 36.34	1.7966	11 5 32.3	13.287	23	0 3 20.21	1.7595	N. 0 7 30.3	14.466
24	22 40 24.07	1.7943	S. 10 52 13.8	13.329	24	0 5 5.81	1.7604	N. 0 21 58.4	14.471

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 5.					MONDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	0 5 5.81	1.7604	N. 0 21 58.4	14.471	0	1 31 56.06	1.8845	N. 11 47 3.8	13.724
1	0 6 51.46	1.7613	0 36 26.8	14.476	1	1 33 49.26	1.8888	12 0 46.1	13.685
2	0 8 37.17	1.7623	0 50 55.5	14.480	2	1 35 42.72	1.8932	12 14 26.0	13.644
3	0 10 22.94	1.7634	1 5 24.4	14.483	3	1 37 36.44	1.8976	12 28 3.4	13.603
4	0 12 8.78	1.7646	1 19 53.5	14.487	4	1 39 30.43	1.9020	12 41 38.3	13.561
5	0 13 54.69	1.7658	1 34 22.8	14.488	5	1 41 24.68	1.9065	12 55 10.7	13.518
6	0 15 40.67	1.7671	1 48 52.1	14.488	6	1 43 19.21	1.9112	13 8 40.4	13.473
7	0 17 26.74	1.7685	2 3 21.4	14.488	7	1 45 14.02	1.9158	13 22 7.4	13.427
8	0 19 12.89	1.7699	2 17 50.7	14.488	8	1 47 9.11	1.9206	13 35 31.6	13.380
9	0 20 59.13	1.7714	2 32 20.0	14.487	9	1 49 4.49	1.9253	13 48 53.0	13.332
10	0 22 45.46	1.7730	2 46 49.1	14.484	10	1 51 0.15	1.9302	14 2 11.5	13.283
11	0 24 31.89	1.7747	3 1 18.1	14.481	11	1 52 56.11	1.9352	14 15 27.0	13.233
12	0 26 18.42	1.7764	3 15 46.8	14.476	12	1 54 52.37	1.9402	14 28 39.5	13.182
13	0 28 5.06	1.7782	3 30 15.2	14.472	13	1 56 48.93	1.9452	14 41 48.9	13.130
14	0 29 51.80	1.7800	3 44 43.4	14.467	14	1 58 45.79	1.9503	14 54 55.1	13.076
15	0 31 38.66	1.7819	3 59 11.2	14.459	15	2 0 42.96	1.9554	15 7 58.0	13.022
16	0 33 25.63	1.7839	4 13 38.5	14.452	16	2 2 40.44	1.9607	15 20 57.6	12.966
17	0 35 12.73	1.7860	4 28 5.4	14.444	17	2 4 38.24	1.9660	15 33 53.9	12.909
18	0 36 59.95	1.7882	4 42 31.8	14.434	18	2 6 36.36	1.9713	15 46 46.7	12.851
19	0 38 47.31	1.7904	4 56 57.5	14.423	19	2 8 34.80	1.9767	15 59 36.0	12.791
20	0 40 34.80	1.7926	5 11 22.6	14.412	20	2 10 33.56	1.9821	16 12 21.6	12.729
21	0 42 22.42	1.7949	5 25 47.0	14.401	21	2 12 32.65	1.9876	16 25 3.6	12.668
22	0 44 10.19	1.7974	5 40 10.7	14.388	22	2 14 32.07	1.9932	16 37 41.8	12.606
23	0 45 58.11	1.7999	N. 5 54 33.6	14.375	23	2 16 31.83	1.9988	N. 16 50 16.2	12.541
	SUNDAY 6.					TUESDAY 8.			
0	0 47 46.18	1.8025	N. 6 8 55.7	14.360	0	2 18 31.93	2.0045	N. 17 2 46.7	12.475
1	0 49 34.41	1.8051	6 23 16.8	14.344	1	2 20 32.37	2.0102	17 15 13.2	12.408
2	0 51 22.79	1.8078	6 37 37.0	14.328	2	2 22 33.15	2.0159	17 27 35.7	12.341
3	0 53 11.34	1.8105	6 51 56.2	14.311	3	2 24 34.28	2.0218	17 39 54.1	12.272
4	0 55 0.05	1.8133	7 6 14.3	14.292	4	2 26 35.77	2.0277	17 52 8.3	12.201
5	0 56 48.94	1.8163	7 20 31.3	14.273	5	2 28 37.61	2.0336	18 4 18.2	12.129
6	0 58 38.01	1.8193	7 34 47.1	14.253	6	2 30 39.80	2.0396	18 16 23.8	12.057
7	1 0 27.25	1.8223	7 49 1.7	14.232	7	2 32 42.36	2.0457	18 28 25.0	11.983
8	1 2 16.68	1.8254	8 3 15.0	14.210	8	2 34 45.28	2.0517	18 40 21.7	11.907
9	1 4 6.30	1.8287	8 17 26.9	14.187	9	2 36 48.57	2.0578	18 52 13.8	11.829
10	1 5 56.12	1.8319	8 31 37.4	14.163	10	2 38 52.22	2.0639	19 4 1.3	11.752
11	1 7 46.13	1.8352	8 45 46.5	14.138	11	2 40 56.24	2.0702	19 15 44.0	11.673
12	1 9 36.34	1.8385	8 59 54.0	14.113	12	2 43 0.64	2.0765	19 27 21.9	11.591
13	1 11 26.75	1.8420	9 14 0.0	14.086	13	2 45 5.42	2.0827	19 38 54.9	11.509
14	1 13 17.38	1.8456	9 28 4.3	14.057	14	2 47 10.57	2.0890	19 50 23.0	11.427
15	1 15 8.22	1.8492	9 42 6.9	14.028	15	2 49 16.10	2.0954	20 1 46.1	11.342
16	1 16 59.28	1.8528	9 56 7.7	13.998	16	2 51 22.02	2.1018	20 13 4.0	11.255
17	1 18 50.56	1.8565	10 10 6.7	13.968	17	2 53 28.32	2.1082	20 24 16.7	11.167
18	1 20 42.06	1.8603	10 24 3.9	13.937	18	2 55 35.01	2.1147	20 35 24.1	11.078
19	1 22 33.79	1.8642	10 37 59.1	13.903	19	2 57 42.09	2.1212	20 46 26.1	10.989
20	1 24 25.76	1.8682	10 51 52.3	13.869	20	2 59 49.56	2.1277	20 57 22.8	10.898
21	1 26 17.97	1.8722	11 5 43.4	13.834	21	3 1 57.42	2.1342	21 8 13.9	10.805
22	1 28 10.42	1.8762	11 19 32.4	13.798	22	3 4 5.67	2.1408	21 18 59.4	10.711
23	1 30 3.12	1.8803	11 33 19.2	13.762	23	3 6 14.32	2.1475	21 29 39.2	10.616
24	1 31 56.06	1.8845	N. 11 47 3.8	13.724	24	3 8 23.37	2.1541	N. 21 40 13.3	10.519

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 9.					FRIDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	3 8 23.37	2.1541	N.21 40 13.3	10.519	0	4 59 23.00	2.4582	N.27 47 39.3	4.282
1	3 10 32.81	2.1608	21 50 41.5	10.421	1	5 1 50.65	2.4633	27 51 51.4	4.122
2	3 12 42.66	2.1675	22 1 3.8	10.321	2	5 4 18.60	2.4682	27 55 53.9	3.961
3	3 14 52.91	2.1742	22 11 20.0	10.220	3	5 6 46.84	2.4730	27 59 46.7	3.798
4	3 17 3.56	2.1808	22 21 30.2	10.118	4	5 9 15.36	2.4777	28 3 29.7	3.635
5	3 19 14.61	2.1876	22 31 34.2	10.014	5	5 11 44.16	2.4823	28 7 2.9	3.470
6	3 21 26.07	2.1944	22 41 31.9	9.909	6	5 14 13.24	2.4868	28 10 26.1	3.304
7	3 23 37.93	2.2011	22 51 23.3	9.803	7	5 16 42.58	2.4912	28 13 39.4	3.137
8	3 25 50.20	2.2078	23 1 8.3	9.695	8	5 19 12.19	2.4956	28 16 42.6	2.970
9	3 28 2.87	2.2146	23 10 46.7	9.586	9	5 21 42.05	2.4998	28 19 35.8	2.802
10	3 30 15.95	2.2214	23 20 18.6	9.476	10	5 24 12.16	2.5038	28 22 18.9	2.633
11	3 32 29.44	2.2282	23 29 43.8	9.363	11	5 26 42.51	2.5077	28 24 51.8	2.463
12	3 34 43.33	2.2349	23 39 2.2	9.250	12	5 29 13.09	2.5116	28 27 14.4	2.292
13	3 36 57.63	2.2417	23 48 13.8	9.136	13	5 31 43.90	2.5153	28 29 26.8	2.120
14	3 39 12.34	2.2484	23 57 18.5	9.019	14	5 34 14.92	2.5188	28 31 28.8	1.948
15	3 41 27.45	2.2552	24 6 16.1	8.902	15	5 36 46.16	2.5223	28 33 20.5	1.775
16	3 43 42.96	2.2619	24 15 6.7	8.783	16	5 39 17.60	2.5256	28 35 1.8	1.601
17	3 45 58.88	2.2687	24 23 50.1	8.663	17	5 41 49.23	2.5287	28 36 32.6	1.427
18	3 48 15.21	2.2755	24 32 26.3	8.542	18	5 44 21.05	2.5318	28 37 53.0	1.252
19	3 50 31.94	2.2822	24 40 55.1	8.418	19	5 46 53.05	2.5348	28 39 2.8	1.075
20	3 52 49.07	2.2888	24 49 16.5	8.294	20	5 49 25.22	2.5376	28 40 2.0	0.898
21	3 55 6.60	2.2955	24 57 30.4	8.168	21	5 51 57.56	2.5402	28 40 50.6	0.722
22	3 57 24.53	2.3022	25 5 36.7	8.041	22	5 54 30.05	2.5427	28 41 28.6	0.544
23	3 59 42.86	2.3088	N.25 13 35.3	7.912	23	5 57 2.69	2.5452	N.28 41 55.9	0.367
	THURSDAY 10.					SATURDAY 12.			
0	4 2 1.58	2.3153	N.25 21 26.2	7.783	0	5 59 35.47	2.5475	N.28 42 12.6	0.188
1	4 4 20.70	2.3220	25 29 9.3	7.652	1	6 2 8.38	2.5496	28 42 18.5	+0.008
2	4 6 40.22	2.3286	25 36 44.4	7.519	2	6 4 41.42	2.5515	28 42 13.6	−0.172
3	4 9 0.13	2.3350	25 44 11.6	7.386	3	6 7 14.57	2.5534	28 41 57.9	0.351
4	4 11 20.42	2.3414	25 51 30.7	7.250	4	6 9 47.83	2.5551	28 41 31.5	0.531
5	4 13 41.10	2.3478	25 58 41.6	7.113	5	6 12 21.18	2.5566	28 40 54.2	0.712
6	4 16 2.16	2.3542	26 5 44.3	6.976	6	6 14 54.62	2.5580	28 40 6.1	0.892
7	4 18 23.61	2.3606	26 12 38.7	6.837	7	6 17 28.14	2.5593	28 39 7.1	1.073
8	4 20 45.43	2.3668	26 19 24.7	6.697	8	6 20 1.74	2.5605	28 37 57.2	1.255
9	4 23 7.63	2.3731	26 26 2.3	6.555	9	6 22 35.40	2.5615	28 36 36.5	1.437
10	4 25 30.20	2.3793	26 32 31.3	6.412	10	6 25 9.12	2.5623	28 35 4.9	1.618
11	4 27 53.14	2.3853	26 38 51.7	6.268	11	6 27 42.89	2.5631	28 33 22.3	1.801
12	4 30 16.44	2.3913	26 45 3.4	6.122	12	6 30 16.69	2.5637	28 31 28.8	1.983
13	4 32 40.10	2.3973	26 51 6.3	5.975	13	6 32 50.52	2.5641	28 29 24.4	2.165
14	4 35 4.12	2.4033	26 57 0.4	5.827	14	6 35 24.38	2.5644	28 27 9.0	2.347
15	4 37 28.50	2.4092	27 2 45.6	5.678	15	6 37 58.25	2.5645	28 24 42.7	2.529
16	4 39 53.22	2.4149	27 8 21.8	5.528	16	6 40 32.12	2.5645	28 22 5.5	2.711
17	4 42 18.29	2.4207	27 13 48.9	5.376	17	6 43 5.99	2.5643	28 19 17.4	2.893
18	4 44 43.70	2.4263	27 19 6.9	5.223	18	6 45 39.84	2.5641	28 16 18.3	3.076
19	4 47 9.44	2.4318	27 24 15.7	5.069	19	6 48 13.68	2.5638	28 13 8.3	3.258
20	4 49 35.51	2.4373	27 29 15.2	4.914	20	6 50 47.49	2.5632	28 9 47.4	3.440
21	4 52 1.91	2.4427	27 34 5.4	4.758	21	6 53 21.26	2.5625	28 6 15.6	3.622
22	4 54 28.63	2.4479	27 38 46.2	4.601	22	6 55 54.99	2.5617	28 2 32.8	3.803
23	4 56 55.66	2.4531	27 43 17.5	4.443	23	6 58 28.67	2.5607	27 58 39.1	3.985
24	4 59 23.00	2.4582	N.27 47 39.3	4.282	24	7 1 2.28	2.5596	N.27 54 34.6	4.166

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 13.			
	h m s	s	° ′ ″	″
0	7 1 2.28	2.5596	N.27 54 34.6	4.166
1	7 3 35.82	2.5584	27 50 19.2	4.347
2	7 6 9.29	2.5571	27 45 53.0	4.528
3	7 8 42.68	2.5557	27 41 15.9	4.708
4	7 11 15.97	2.5540	27 36 28.1	4.887
5	7 13 49.16	2.5523	27 31 29.5	5.066
6	7 16 22.25	2.5505	27 26 20.2	5.245
7	7 18 55.22	2.5486	27 21 0.1	5.423
8	7 21 28.08	2.5466	27 15 29.4	5.601
9	7 24 0.81	2.5443	27 9 48.0	5.778
10	7 26 33.40	2.5421	27 3 56.0	5.955
11	7 29 5.86	2.5398	26 57 53.4	6.131
12	7 31 38.17	2.5372	26 51 40.3	6.306
13	7 34 10.32	2.5345	26 45 16.7	6.481
14	7 36 42.31	2.5318	26 38 42.6	6.655
15	7 39 14.14	2.5290	26 31 58.1	6.828
16	7 41 45.79	2.5260	26 25 3.2	7.001
17	7 44 17.26	2.5230	26 17 58.0	7.173
18	7 46 48.55	2.5199	26 10 42.4	7.345
19	7 49 19.65	2.5167	26 3 16.6	7.514
20	7 51 50.56	2.5134	25 55 40.7	7.683
21	7 54 21.26	2.5100	25 47 54.6	7.852
22	7 56 51.76	2.5066	25 39 58.4	8.021
23	7 59 22.05	2.5030	N.25 31 52.1	8.188
	MONDAY 14.			
0	8 1 52.12	2.4993	N.25 23 35.9	8.353
1	8 4 21.97	2.4957	25 15 9.7	8.518
2	8 6 51.60	2.4919	25 6 33.7	8.682
3	8 9 21.00	2.4881	24 57 47.9	8.845
4	8 11 50.17	2.4842	24 48 52.3	9.007
5	8 14 19.10	2.4802	24 39 47.1	9.168
6	8 16 47.79	2.4761	24 30 32.2	9.328
7	8 19 16.23	2.4720	24 21 7.7	9.487
8	8 21 44.43	2.4679	24 11 33.8	9.644
9	8 24 12.38	2.4637	24 1 50.5	9.800
10	8 26 40.07	2.4594	23 51 57.8	9.956
11	8 29 7.51	2.4552	23 41 55.8	10.110
12	8 31 34.69	2.4508	23 31 44.6	10.262
13	8 34 1.61	2.4464	23 21 24.3	10.414
14	8 36 28.26	2.4420	23 10 54.9	10.564
15	8 38 54.65	2.4377	23 0 16.6	10.713
16	8 41 20.78	2.4332	22 49 29.3	10.862
17	8 43 46.63	2.4286	22 38 33.1	11.009
18	8 46 12.21	2.4241	22 27 28.2	11.153
19	8 48 37.52	2.4195	22 16 14.7	11.297
20	8 51 2.55	2.4149	22 4 52.5	11.441
21	8 53 27.31	2.4103	21 53 21.8	11.583
22	8 55 51.79	2.4057	21 41 42.6	11.723
23	8 58 15.99	2.4011	21 29 55.1	11.861
24	9 0 39.92	2.3965	N.21 17 59.3	11.998

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 15.			
	h m s	s	° ′ ″	″
0	9 0 39.92	2.3965	N.21 17 59.3	11.998
1	9 3 3.57	2.3918	21 5 55.3	12.133
2	9 5 26.94	2.3872	20 53 43.3	12.268
3	9 7 50.03	2.3825	20 41 23.2	12.402
4	9 10 12.84	2.3778	20 28 55.1	12.533
5	9 12 35.37	2 3733	20 16 19.2	12.663
6	9 14 57.63	2.3687	20 3 35.5	12.792
7	9 17 19.61	2.3640	19 50 44.2	12.918
8	9 19 41.31	2.3593	19 37 45.3	13.045
9	9 22 2.73	2.3547	19 24 38.9	13.169
10	9 24 23.87	2.3501	19 11 25.0	13.292
11	9 26 44.74	2.3455	18 58 3.8	13.413
12	9 29 5.33	2.3409	18 44 35.4	13.533
13	9 31 25.65	2.3365	18 30 59.9	13.650
14	9 33 45.71	2.3320	18 17 17.4	13.767
15	9 36 5.49	2.3275	18 3 27.9	13.883
16	9 38 25.01	2.3230	17 49 31.5	13.996
17	9 40 44.25	2.3185	17 35 28.4	14.108
18	9 43 3.23	2.3142	17 21 18.6	14.218
19	9 45 21.95	2.3097	17 7 2.2	14.327
20	9 47 40.40	2.3053	16 52 39.4	14.433
21	9 49 58.59	2.3011	16 38 10.2	14.539
22	9 52 16.53	2.2968	16 23 34.7	14.643
23	9 54 34.21	2.2926	N.16 8 53.0	14.746
	WEDNESDAY 16.			
0	9 56 51.64	2.2885	N.15 54 5.2	14.847
1	9 59 8.83	2.2844	15 39 11.4	14.945
2	10 1 25.77	2.2803	15 24 11.8	15.043
3	10 3 42.46	2.2763	15 9 6.3	15.138
4	10 5 58.92	2.2723	14 53 55.2	15.232
5	10 8 15.14	2.2683	14 38 38.5	15.324
6	10 10 31.12	2.2644	14 23 16.3	15.416
7	10 12 46.87	2.2607	14 7 48.6	15.505
8	10 15 2.40	2.2570	13 52 15.7	15.592
9	10 17 17.71	2.2533	13 36 37.5	15.678
10	10 19 32.79	2.2496	13 20 54.3	15.762
11	10 21 47.66	2.2460	13 5 6.1	15.844
12	10 24 2.31	2.2424	12 49 13.0	15.925
13	10 26 16.75	2.2390	12 33 15.1	16.004
14	10 28 30.99	2.2356	12 17 12.5	16.081
15	10 30 45.02	2.2323	12 1 5.4	16.157
16	10 32 58.86	2.2290	11 44 53.7	16.231
17	10 35 12.50	2.2258	11 28 37.7	16.303
18	10 37 25.95	2.2227	11 12 17.4	16.373
19	10 39 39.22	2.2196	10 55 52.9	16.442
20	10 41 52.30	2.2165	10 39 24.4	16.508
21	10 44 5.20	2.2136	10 22 51.9	16.574
22	10 46 17.93	2.2108	10 6 15.5	16.637
23	10 48 30.49	2.2080	9 49 35.4	16.699
24	10 50 42.89	2.2052	N. 9 32 51.6	16.759

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 17.					SATURDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	10 50 42.89	2.2052	N. 9 32 51.6	16.759	0	12 34 57.01	2.1695	S. 4 26 35.7	17.520
1	10 52 55.12	2.2026	9 16 4.3	16.817	1	12 37 7.22	2.1708	4 44 6.1	17.491
2	10 55 7.20	2.2001	8 59 13.6	16.873	2	12 39 17.50	2.1722	5 1 34.7	17.461
3	10 57 19.13	2.1976	8 42 19.5	16.928	3	12 41 27.87	2.1735	5 19 1.4	17.428
4	10 59 30.91	2.1952	8 25 22.2	16.981	4	12 43 38.32	2.1749	5 36 26.1	17.393
5	11 1 42.55	2.1928	8 8 21.8	17.032	5	12 45 48.86	2.1765	5 53 48.6	17.357
6	11 3 54.05	2.1906	7 51 18.4	17.082	6	12 47 59.50	2.1782	6 11 8.9	17.318
7	11 6 5.42	2.1884	7 34 12.0	17.129	7	12 50 10.24	2.1799	6 28 26.8	17.278
8	11 8 16.66	2.1863	7 17 2.9	17.174	8	12 52 21.09	2.1817	6 45 42.3	17.237
9	11 10 27.77	2.1842	6 59 51.1	17.219	9	12 54 32.05	2.1836	7 2 55.2	17.193
10	11 12 38.76	2.1822	6 42 36.6	17.262	10	12 56 43.12	2.1855	7 20 5.5	17.148
11	11 14 49.64	2.1804	6 25 19.7	17.302	11	12 58 54.31	2.1875	7 37 13.0	17.101
12	11 17 0.41	2.1786	6 8 0.4	17.340	12	13 1 5.62	2.1896	7 54 17.6	17.052
13	11 19 11.07	2.1769	5 50 38.9	17.377	13	13 3 17.06	2.1917	8 11 19.2	17.001
14	11 21 21.64	2.1753	5 33 15.2	17.412	14	13 5 28.63	2.1939	8 28 17.7	16.948
15	11 23 32.11	2.1738	5 15 49.5	17.445	15	13 7 40.33	2.1962	8 45 13.0	16.893
16	11 25 42.49	2.1723	4 58 21.8	17.477	16	13 9 52.17	2.1986	9 2 4.9	16.837
17	11 27 52.78	2.1709	4 40 52.3	17.507	17	13 12 4.16	2.2010	9 18 53.4	16.778
18	11 30 3.00	2.1697	4 23 21.1	17.534	18	13 14 16.29	2.2035	9 35 38.3	16.718
19	11 32 13.14	2.1684	4 5 48.2	17.560	19	13 16 28.58	2.2061	9 52 19.6	16.657
20	11 34 23.21	2.1672	3 48 13.8	17.585	20	13 18 41.02	2.2087	10 8 57.2	16.594
21	11 36 33.21	2.1662	3 30 38.0	17.608	21	13 20 53.62	2.2113	10 25 30.9	16.528
22	11 38 43.16	2.1653	3 13 0.9	17.628	22	13 23 6.38	2.2140	10 42 0.6	16.461
23	11 40 53.05	2.1644	N. 2 55 22.7	17.646	23	13 25 19.30	2.2168	S. 10 58 26.2	16.393
	FRIDAY 18.					SUNDAY 20.			
0	11 43 2.89	2.1637	N. 2 37 43.4	17.663	0	13 27 32.40	2.2197	S. 11 14 47.7	16.322
1	11 45 12.69	2.1629	2 20 3.1	17.678	1	13 29 45.67	2.2227	11 31 4.9	16.249
2	11 47 22.44	2.1622	2 2 22.0	17.692	2	13 31 59.12	2.2256	11 47 17.6	16.175
3	11 49 32.16	2.1617	1 44 40.1	17.703	3	13 34 12.74	2.2286	12 3 25.8	16.099
4	11 51 41.85	2.1613	1 26 57.6	17.712	4	13 36 26.55	2.2317	12 19 29.5	16.022
5	11 53 51.52	2.1609	1 9 14.6	17.720	5	13 38 40.54	2.2348	12 35 28.5	15.943
6	11 56 1.16	2.1606	0 51 31.2	17.727	6	13 40 54.72	2.2379	12 51 22.6	15.861
7	11 58 10.79	2.1604	0 33 47.4	17.731	7	13 43 9.09	2.2412	13 7 11.8	15.778
8	12 0 20.41	2.1603	N. 0 16 3.5	17.733	8	13 45 23.66	2.2445	13 22 55.9	15.693
9	12 2 30.02	2.1602	S. 0 1 40.5	17.733	9	13 47 38.43	2.2478	13 38 34.9	15.607
10	12 4 39.63	2.1603	0 19 24.5	17.732	10	13 49 53.40	2.2512	13 54 8.7	15.518
11	12 6 49.25	2.1604	0 37 8.4	17.729	11	13 52 8.57	2.2545	14 9 37.1	15.428
12	12 8 58.88	2.1606	0 54 52.0	17.723	12	13 54 23.94	2.2580	14 25 0.1	15.337
13	12 11 8.52	2.1609	1 12 35.2	17.717	13	13 56 39.52	2.2615	14 40 17.5	15.243
14	12 13 18.19	2.1613	1 30 18.0	17.708	14	13 58 55.32	2.2650	14 55 29.3	15.149
15	12 15 27.88	2.1617	1 48 0.2	17.697	15	14 1 11.33	2.2686	15 10 35.4	15.053
16	12 17 37.60	2.1622	2 5 41.7	17.685	16	14 3 27.55	2.2722	15 25 35.6	14.954
17	12 19 47.35	2.1628	2 23 22.4	17.671	17	14 5 43.99	2.2758	15 40 29.9	14.854
18	12 21 57.14	2.1636	2 41 2.2	17.655	18	14 8 0.64	2.2794	15 55 18.1	14.753
19	12 24 6.98	2.1644	2 58 41.0	17.637	19	14 10 17.52	2.2831	16 10 0.2	14.650
20	12 26 16.87	2.1653	3 16 18.6	17.617	20	14 12 34.61	2.2868	16 24 36.1	14.545
21	12 28 26.81	2.1662	3 33 55.0	17.596	21	14 14 51.93	2.2906	16 39 5.6	14.438
22	12 30 36.81	2.1672	3 51 30.1	17.573	22	14 17 9.48	2.2943	16 53 28.7	14.331
23	12 32 46.88	2.1683	4 9 3.7	17.547	23	14 19 27.25	2.2981	17 7 45.3	14.222
24	12 34 57.01	2.1695	S. 4 26 35.7	17.520	24	14 21 45.25	2.3019	S. 17 21 55.3	14.111

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 21.			
	h m s	s	° ′ ″	″
0	14 21 45.25	2.3019	S. 17 21 55.3	14.111
1	14 24 3.48	2.3057	17 35 58.6	13.998
2	14 26 21.94	2.3095	17 49 55.0	13.883
3	14 28 40.62	2.3133	18 3 44.5	13.767
4	14 30 59.54	2.3172	18 17 27.0	13.650
5	14 33 18.69	2.3211	18 31 2.5	13.532
6	14 35 38.07	2.3250	18 44 30.8	13.412
7	14 37 57.69	2.3289	18 57 51.9	13.290
8	14 40 17.54	2.3327	19 11 5.6	13.166
9	14 42 37.62	2.3366	19 24 11.8	13.041
10	14 44 57.93	2.3404	19 37 10.5	12.915
11	14 47 18.47	2.3443	19 50 1.6	12.788
12	14 49 39.25	2.3482	20 2 45.1	12.659
13	14 52 0.26	2.3521	20 15 20.7	12.528
14	14 54 21.50	2.3559	20 27 48.5	12.397
15	14 56 42.97	2.3598	20 40 8.4	12.264
16	14 59 4.67	2.3636	20 52 20.2	12.129
17	15 1 26.60	2.3673	21 4 23.9	11.993
18	15 3 48.75	2.3711	21 16 19.4	11.857
19	15 6 11.13	2.3748	21 28 6.7	11.718
20	15 8 33.73	2.3785	21 39 45.6	11.578
21	15 10 56.55	2.3822	21 51 16.1	11.437
22	15 13 19.59	2.3858	22 2 38.1	11.296
23	15 15 42.85	2.3895	S. 22 13 51.6	11.153
	TUESDAY 22.			
0	15 18 6.33	2.3931	S. 22 24 56.4	11.008
1	15 20 30.02	2.3967	22 35 52.5	10.862
2	15 22 53.93	2.4002	22 46 39.9	10.716
3	15 25 18.04	2.4036	22 57 18.4	10.568
4	15 27 42.36	2.4070	23 7 48.0	10.418
5	15 30 6.88	2.4103	23 18 8.6	10.268
6	15 32 31.60	2.4137	23 28 20.2	10.117
7	15 34 56.52	2.4169	23 38 22.7	9.965
8	15 37 21.63	2.4201	23 48 16.0	9.812
9	15 39 46.93	2.4232	23 58 0.1	9.658
10	15 42 12.41	2.4263	24 7 34.9	9.503
11	15 44 38.08	2.4293	24 17 0.4	9.347
12	15 47 3.92	2.4322	24 26 16.5	9.190
13	15 49 29.94	2.4351	24 35 23.2	9.032
14	15 51 56.13	2.4379	24 44 20.4	8.873
15	15 54 22.49	2.4407	24 53 8.0	8.713
16	15 56 49.01	2.4433	25 1 46.0	8.553
17	15 59 15.68	2.4458	25 10 14.4	8.392
18	16 1 42.51	2.4483	25 18 33.1	8.231
19	16 4 9.48	2.4507	25 26 42.1	8.068
20	16 6 36.60	2.4531	25 34 41.3	7.905
21	16 9 3.85	2.4553	25 42 30.7	7.741
22	16 11 31.23	2.4574	25 50 10.2	7.576
23	16 13 58.74	2.4595	25 57 39.8	7.411
24	16 16 26.37	2.4614	S. 26 4 59.5	7.245

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 23.			
	h m s	s	° ′ ″	″
0	16 16 26.37	2.4614	S. 26 4 59.5	7.245
1	16 18 54.11	2.4632	26 12 9.2	7.078
2	16 21 21.96	2.4650	26 19 8.9	6.912
3	16 23 49.91	2.4667	26 25 58.6	6.745
4	16 26 17.96	2.4683	26 32 38.3	6.577
5	16 28 46.10	2.4698	26 39 7.8	6.408
6	16 31 14.33	2.4711	26 45 27.2	6.239
7	16 33 42.63	2.4723	26 51 36.5	6.070
8	16 36 11.00	2.4734	26 57 35.6	5.900
9	16 38 39.44	2.4745	27 3 24.5	5.731
10	16 41 7.94	2.4755	27 9 3.3	5.561
11	16 43 36.50	2.4763	27 14 31.8	5.390
12	16 46 5.10	2.4769	27 19 50.1	5.219
13	16 48 33.73	2.4775	27 24 58.1	5.048
14	16 51 2.40	2.4780	27 29 55.9	4.877
15	16 53 31.09	2.4783	27 34 43.4	4.706
16	16 55 59.80	2.4786	27 39 20.6	4.534
17	16 58 28.52	2.4787	27 43 47.5	4.363
18	17 0 57.24	2.4787	27 48 4.2	4.192
19	17 3 25.96	2.4786	27 52 10.5	4.020
20	17 5 54.67	2.4783	27 56 6.6	3.848
21	17 8 23.36	2.4779	27 59 52.3	3.677
22	17 10 52.02	2.4774	28 3 27.8	3.506
23	17 13 20.65	2.4768	S. 28 6 53.0	3.334
	THURSDAY 24.			
0	17 15 49.24	2.4761	S. 28 10 7.9	3.163
1	17 18 17.78	2.4753	28 13 12.5	2.991
2	17 20 46.27	2.4743	28 16 6.8	2.820
3	17 23 14.69	2.4731	28 18 50.9	2.649
4	17 25 43.04	2.4718	28 21 24.7	2.478
5	17 28 11.31	2.4705	28 23 48.3	2.308
6	17 30 39.50	2.4691	28 26 1.7	2.138
7	17 33 7.60	2.4675	28 28 4.9	1.968
8	17 35 35.60	2.4658	28 29 57.9	1.799
9	17 38 3.49	2.4639	28 31 40.8	1.630
10	17 40 31.27	2.4620	28 33 13.5	1.461
11	17 42 58.93	2.4599	28 34 36.1	1.292
12	17 45 26.46	2.4577	28 35 48.6	1.124
13	17 47 53.86	2.4554	28 36 51.0	0.957
14	17 50 21.11	2.4529	28 37 43.4	0.790
15	17 52 48.21	2.4504	28 38 25.8	0.623
16	17 55 15.16	2.4477	28 38 58.2	0.457
17	17 57 41.94	2.4449	28 39 20.7	0.292
18	18 0 8.55	2.4420	28 39 33.3	−0.127
19	18 2 34.98	2.4390	28 39 36.0	+0.037
20	18 5 1.23	2.4359	28 39 28.9	0.200
21	18 7 27.29	2.4327	28 39 12.0	0.363
22	18 9 53.15	2.4293	28 38 45.3	0.526
23	18 12 18.81	2.4259	28 38 8.9	0.687
24	18 14 44.26	2.4223	S. 28 37 22.8	0.848

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 25.					SUNDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	18 14 44.26	2.4223	S. 28 37 22.8	0.848	0	20 5 23.27	2.1676	S. 25 8 17.6	7.471
1	18 17 9.49	2.4187	28 36 27.1	1.008	1	20 7 33.14	2.1614	25 0 46.0	7.582
2	18 19 34.50	2.4149	28 35 21.8	1.168	2	20 9 42.64	2.1553	24 53 7.8	7.692
3	18 21 59.28	2.4111	28 34 7.0	1.327	3	20 11 51.78	2.1492	24 45 22.9	7.802
4	18 24 23.83	2.4072	28 32 42.6	1.485	4	20 14 0.55	2.1431	24 37 31.5	7.911
5	18 26 48.14	2.4031	28 31 8.8	1.642	5	20 16 8.95	2.1369	24 29 33.6	8.018
6	18 29 12.20	2.3989	28 29 25.6	1.798	6	20 18 16.98	2.1308	24 21 29.3	8.125
7	18 31 36.01	2.3947	28 27 33.1	1.953	7	20 20 24.64	2.1247	24 13 18.6	8.230
8	18 33 59.56	2.3903	28 25 31.2	2.108	8	20 22 31.94	2.1186	24 5 1.7	8.333
9	18 36 22.85	2.3859	28 23 20.1	2.262	9	20 24 38.87	2.1125	23 56 38.6	8.437
10	18 38 45.87	2.3814	28 20 59.8	2.415	10	20 26 45.44	2.1064	23 48 9.3	8.539
11	18 41 8.62	2.3768	28 18 30.3	2.567	11	20 28 51.64	2.1003	23 39 33.9	8.640
12	18 43 31.09	2.3722	28 15 51.7	2.718	12	20 30 57.48	2.0943	23 30 52.5	8.740
13	18 45 53.28	2.3674	28 13 4.1	2.868	13	20 33 2.96	2.0883	23 22 5.1	8.838
14	18 48 15.18	2.3625	28 10 7.5	3.017	14	20 35 8.08	2.0823	23 13 11.9	8.936
15	18 50 36.78	2.3576	28 7 2.0	3.166	15	20 37 12.84	2.0764	23 4 12.8	9.033
16	18 52 58.09	2.3527	28 3 47.6	3.313	16	20 39 17.25	2.0705	22 55 8.0	9.128
17	18 55 19.10	2.3476	28 0 24.4	3.459	17	20 41 21.30	2.0646	22 45 57.5	9.222
18	18 57 39.80	2.3424	27 56 52.5	3.604	18	20 43 25.00	2.0587	22 36 41.3	9.316
19	19 0 0.19	2.3372	27 53 11.9	3.749	19	20 45 28.35	2.0528	22 27 19.6	9.408
20	19 2 20.27	2.3320	27 49 22.6	3.892	20	20 47 31.34	2.0470	22 17 52.3	9.500
21	19 4 40.03	2.3267	27 45 24.8	4.034	21	20 49 33.99	2.0412	22 8 19.6	9.591
22	19 6 59.47	2.3213	27 41 18.5	4.176	22	20 51 36.29	2.0355	21 58 41.4	9.681
23	19 9 18.58	2.3158	S. 27 37 3.7	4.317	23	20 53 38.25	2.0298	S. 21 48 57.9	9.768
	SATURDAY 26.					MONDAY 28.			
0	19 11 37.37	2.3103	S. 27 32 40.5	4.456	0	20 55 39.87	2.0242	S. 21 39 9.2	9.855
1	19 13 55.82	2.3048	27 28 9.0	4.594	1	20 57 41.15	2.0185	21 29 15.3	9.942
2	19 16 13.94	2.2992	27 23 29.2	4.731	2	20 59 42.09	2.0129	21 19 16.2	10.028
3	19 18 31.72	2.2935	27 18 41.3	4.867	3	21 1 42.70	2.0073	21 9 12.0	10.112
4	19 20 49.16	2.2878	27 13 45.2	5.002	4	21 3 42.97	2.0018	20 59 2.8	10.195
5	19 23 6.26	2.2821	27 8 41.1	5.135	5	21 5 42.92	1.9964	20 48 48.6	10.277
6	19 25 23.01	2.2763	27 3 29.0	5.268	6	21 7 42.54	1.9909	20 38 29.5	10.359
7	19 27 39.41	2.2704	26 58 8.9	5.400	7	21 9 41.83	1.9855	20 28 5.5	10.439
8	19 29 55.46	2.2646	26 52 41.0	5.530	8	21 11 40.80	1.9802	20 17 36.8	10.518
9	19 32 11.16	2.2587	26 47 5.3	5.660	9	21 13 39.46	1.9750	20 7 3.3	10.597
10	19 34 26.50	2.2528	26 41 21.8	5.789	10	21 15 37.80	1.9697	19 56 25.1	10.675
11	19 36 41.49	2.2468	26 35 30.6	5.917	11	21 17 35.82	1.9645	19 45 42.3	10.752
12	19 38 56.12	2.2408	26 29 31.8	6.043	12	21 19 33.54	1.9594	19 34 54.9	10.828
13	19 41 10.39	2.2348	26 23 25.5	6.168	13	21 21 30.95	1.9543	19 24 3.0	10.902
14	19 43 24.30	2.2288	26 17 11.7	6.292	14	21 23 28.05	1.9492	19 13 6.7	10.976
15	19 45 37.84	2.2227	26 10 50.5	6.414	15	21 25 24.85	1.9442	19 2 5.9	11.049
16	19 47 51.02	2.2167	26 4 22.0	6.536	16	21 27 21.36	1.9393	18 51 0.8	11.122
17	19 50 3.84	2.2106	25 57 46.2	6.657	17	21 29 17.57	1.9344	18 39 51.3	11.193
18	19 52 16.29	2.2044	25 51 3.2	6.776	18	21 31 13.49	1.9296	18 28 37.6	11.263
19	19 54 28.37	2.1983	25 44 13.1	6.894	19	21 33 9.12	1.9248	18 17 19.8	11.332
20	19 56 40.09	2.1922	25 37 15.9	7.012	20	21 35 4.46	1.9201	18 5 57.8	11.401
21	19 58 51.44	2.1861	25 30 11.7	7.128	21	21 36 59.53	1.9155	17 54 31.7	11.468
22	20 1 2.42	2.1799	25 23 0.5	7.243	22	21 38 54.32	1.9108	17 43 1.6	11.535
23	20 3 13.03	2.1738	25 15 42.5	7.358	23	21 40 48.83	1.9063	17 31 27.5	11.601
24	20 5 23.27	2.1676	S. 25 8 17.6	7.471	24	21 42 43.07	1.9018	S. 17 19 49.5	11.666

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 29.			
	h m s	s	° ′ ″	″
0	21 42 43.07	1.9018	S. 17 19 49.5	11.666
1	21 44 37.05	1.8974	17 8 7.6	11.730
2	21 46 30.76	1.8930	16 56 21.9	11.793
3	21 48 24.21	1.8887	16 44 32.4	11.856
4	21 50 17.41	1.8845	16 32 39.2	11.917
5	21 52 10.35	1.8803	16 20 42.3	11.978
6	21 54 3.04	1.8762	16 8 41.8	12.038
7	21 55 55.49	1.8722	15 56 37.7	12.098
8	21 57 47.70	1.8682	15 44 30.0	12.157
9	21 59 39.67	1.8642	15 32 18.9	12.213
10	22 1 31.40	1.8603	15 20 4.4	12.270
11	22 3 22.90	1.8565	15 7 46.5	12.327
12	22 5 14.18	1.8527	14 55 25.2	12.382
13	22 7 5.23	1.8490	14 43 0.7	12.436
14	22 8 56.06	1.8454	14 30 32.9	12.490
15	22 10 46.68	1.8419	14 18 1.9	12.543
16	22 12 37.09	1.8385	14 5 27.8	12.595
17	22 14 27.30	1.8351	13 52 50.5	12.647
18	22 16 17.30	1.8318	13 40 10.2	12.697
19	22 18 7.11	1.8285	13 27 26.9	12.747
20	22 19 56.72	1.8253	13 14 40.6	12.796
21	22 21 46.14	1.8222	13 1 51.4	12.844
22	22 23 35.38	1.8191	12 48 59.3	12.892
23	22 25 24.43	1.8161	S. 12 36 4.4	12.938
	WEDNESDAY 30.			
0	22 27 13.31	1.8132	S. 12 23 6.7	12.984
1	22 29 2.01	1.8103	12 10 6.3	13.029
2	22 30 50.54	1.8074	11 57 3.2	13.074
3	22 32 38.90	1.8047	11 43 57.4	13.118
4	22 34 27.10	1.8021	11 30 49.0	13.162
5	22 36 15.15	1.7995	11 17 38.0	13.204
6	22 38 3.04	1.7969	11 4 24.5	13.246
7	22 39 50.78	1.7944	10 51 8.5	13.287
8	22 41 38.37	1.7921	10 37 50.1	13.327
9	22 43 25.83	1.7898	10 24 29.3	13.366
10	22 45 13.15	1.7875	10 11 6.2	13.405
11	22 47 0.33	1.7853	9 57 40.7	13.443
12	22 48 47.39	1.7832	9 44 13.0	13.481
13	22 50 34.32	1.7812	9 30 43.0	13.518
14	22 52 21.14	1.7794	9 17 10.9	13.553
15	22 54 7.85	1.7775	9 3 36.7	13.588
16	22 55 54.44	1.7756	8 50 0.3	13.623
17	22 57 40.92	1.7738	8 36 21.9	13.657
18	22 59 27.30	1.7722	8 22 41.4	13.691
19	23 1 13.58	1.7706	8 8 59.0	13.723
20	23 2 59.77	1.7691	7 55 14.6	13.755
21	23 4 45.87	1.7676	7 41 28.4	13.786
22	23 6 31.88	1.7662	7 27 40.3	13.817
23	23 8 17.81	1.7648	7 13 50.4	13.846
24	23 10 3.66	1.7636	S. 6 59 58.8	13.874

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY, MAY 1.			
	h m s	s	° ′ ″	″
0	23 10 3.66	1.7636	S. 6 59 58.8	13.874

PHASES OF THE MOON.

			d	h	m
●	New Moon . . .	Apr.	6	5	48.2
☽	First Quarter		13	17	39.2
○	Full Moon		20	9	32.7
☾	Last Quarter		27	18	9.2

			d	h
☾	Apogee	Apr.	2	7.5
☾	Perigee		18	4.6
☾	Apogee		30	0.9

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	THE SUN'S Diff. for 1 Hour.	THE SUN'S Apparent Declination.	THE SUN'S Diff. for 1 Hour.	THE SUN'S Semidiameter.	Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Thur.	1	2 32 17.18	9.538	N.14 58 38.2	+45.60	15 53.90	66.00	2 56.13	0.319
Fri.	2	2 36 6.34	9.561	15 16 45.2	44.98	15 53.66	66.08	3 3.51	0.296
Sat.	3	2 39 56.06	9.584	15 34 37.1	44.34	15 53.42	66.16	3 10.33	0.273
SUN.	4	2 43 46.34	9.607	15 52 13.6	+43.69	15 53.19	66.24	3 16.58	0.249
Mon.	5	2 47 37.19	9.630	16 9 34.4	43.03	15 52.96	66.32	3 22.28	0.226
Tues.	6	2 51 28.60	9.653	16 26 39.1	42.36	15 52.73	66.40	3 27.41	0.202
Wed.	7	2 55 20.58	9.677	16 43 27.4	+41.67	15 52.51	66.48	3 31.97	0.179
Thur.	8	2 59 13.12	9.701	16 59 59.0	40.96	15 52.29	66.56	3 35.97	0.155
Fri.	9	3 3 6.23	9.725	17 16 13.6	40.24	15 52.08	66.65	3 39.41	0.132
Sat.	10	3 6 59.90	9.748	17 32 10.8	+39.51	15 51.87	66.74	3 42.29	0.108
SUN.	11	3 10 54.12	9.771	17 47 50.3	38.77	15 51.66	66.82	3 44.61	0.085
Mon.	12	3 14 48.91	9.794	18 3 11.9	38.02	15 51.46	66.90	3 46.38	0.062
Tues.	13	3 18 44.26	9.818	18 18 15.2	+37.25	15 51.26	66.98	3 47.59	0.039
Wed.	14	3 22 40.16	9.841	18 33 0.0	36.47	15 51.06	67.07	3 48.24	0.016
Thur.	15	3 26 36.61	9.864	18 47 25.9	35.68	15 50.86	67.15	3 48.34	0.007
Fri.	16	3 30 33.62	9.887	19 1 32.8	+34.88	15 50.67	67.23	3 47.89	0.030
Sat.	17	3 34 31.18	9.910	19 15 20.4	34.07	15 50.48	67.31	3 46.89	0.053
SUN.	18	3 38 29.29	9.933	19 28 48.4	33.25	15 50.29	67.39	3 45.34	0.076
Mon.	19	3 42 27.95	9.956	19 41 56.6	+32.42	15 50.11	67.47	3 43.24	0.099
Tues.	20	3 46 27.16	9.979	19 54 44.7	31.58	15 49.92	67.55	3 40.60	0.122
Wed.	21	3 50 26.92	10.002	20 7 12.5	30.73	15 49.74	67.62	3 37.41	0.144
Thur.	22	3 54 27.22	10.024	20 19 19.8	+29.87	15 49.56	67.70	3 33.68	0.167
Fri.	23	3 58 28.06	10.046	20 31 6.4	29.00	15 49.39	67.77	3 29.41	0.189
Sat.	24	4 2 29.44	10.068	20 42 32.0	28.12	15 49.21	67.84	3 24.60	0.211
SUN.	25	4 6 31.35	10.090	20 53 36.3	+27.23	15 49.04	67.91	3 19.26	0.233
Mon.	26	4 10 33.78	10.112	21 4 19.1	26.33	15 48.87	67.98	3 13.41	0.254
Tues.	27	4 14 36.71	10.133	21 14 40.3	25.42	15 48.70	68.05	3 7.05	0.275
Wed.	28	4 18 40.14	10.153	21 24 39.5	+24.50	15 48.54	68.12	3 0.19	0.296
Thur.	29	4 22 44.06	10.173	21 34 16.6	23.57	15 48.39	68.18	2 52.85	0.316
Fri.	30	4 26 48.45	10.192	21 43 31.3	22.64	15 48.24	68.24	2 45.04	0.335
Sat.	31	4 30 53.29	10.211	21 52 23.4	21.70	15 48.09	68.30	2 36.78	0.354
SUN.	32	4 34 58.59	10.229	N.22 0 52.7	+20.74	15 47.94	68.36	2 28.08	0.372

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting $0^s.19$ from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	THE SUN'S Diff. for 1 Hour.	THE SUN'S Apparent Declination.	THE SUN'S Diff. for 1 Hour.	Equation of Time to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ′ ″	″	m s	s	h m s
Thur.	1	2 32 17.65	9.538	N.14 58 40.4	+45.60	2 56.15	0.319	2 35 13.80
Fri.	2	2 36 6.83	9.561	15 16 47.5	44.98	3 3.52	0.296	2 39 10.35
Sat.	3	2 39 56.57	9.584	15 34 39.5	44.34	3 10.34	0.273	2 43 6.91
SUN.	4	2 43 46.87	9.607	15 52 16.0	+43.69	3 16.60	0.249	2 47 3.46
Mon.	5	2 47 37.73	9.631	16 9 36.8	43.03	3 22.29	0.226	2 51 0.02
Tues.	6	2 51 29.16	9.654	16 26 41.6	42.36	3 27.42	0.202	2 54 56.58
Wed.	7	2 55 21.15	9.678	16 43 29.9	+41.67	3 31.98	0.179	2 58 53.13
Thur.	8	2 59 13.70	9.701	17 0 1.5	40.96	3 35.98	0.155	3 2 49.69
Fri.	9	3 3 6.82	9.725	17 16 16.1	40.24	3 39.42	0.132	3 6 46.24
Sat.	10	3 7 0.50	9.749	17 32 13.3	+39.51	3 42.30	0.108	3 10 42.80
SUN.	11	3 10 54.73	9.772	17 47 52.8	38.77	3 44.62	0.085	3 14 39.36
Mon.	12	3 14 49.53	9.795	18 3 14.3	38.02	3 46.38	0.062	3 18 35.92
Tues.	13	3 18 44.88	9.818	18 18 17.6	+37.25	3 47.59	0.039	3 22 32.47
Wed.	14	3 22 40.78	9.841	18 33 2.3	36.47	3 48.24	0.016	3 26 29.03
Thur.	15	3 26 37.24	9.864	18 47 28.2	35.68	3 48.34	0.007	3 30 25.58
Fri.	16	3 30 34.25	9.887	19 1 35.0	+34.88	3 47.89	0.030	3 34 22.14
Sat.	17	3 34 31.81	9.910	19 15 22.5	34.07	3 46.89	0.053	3 38 18.70
SUN.	18	3 38 29.92	9.933	19 28 50.5	33.25	3 45.34	0.076	3 42 15.26
Mon.	19	3 42 28.57	9.955	19 41 58.6	+32.42	3 43.24	0.099	3 46 11.81
Tues.	20	3 46 27.77	9.978	19 54 46.6	31.58	3 40.60	0.122	3 50 8.37
Wed.	21	3 50 27.52	10.001	20 7 14.4	30.73	3 37.41	0.144	3 54 4.93
Thur.	22	3 54 27.81	10.024	20 19 21.6	+29.87	3 33.67	0.167	3 58 1.49
Fri.	23	3 58 28.64	10.046	20 31 8.1	29.00	3 29.40	0.189	4 1 58.04
Sat.	24	4 2 30.01	10.068	20 42 33.6	28.12	3 24.59	0.211	4 5 54.60
SUN.	25	4 6 31.91	10.090	20 53 37.8	+27.23	3 19.25	0.233	4 9 51.16
Mon.	26	4 10 34.32	10.111	21 4 20.5	26.33	3 13.40	0.254	4 13 47.72
Tues.	27	4 14 37.24	10.132	21 14 41.6	25.42	3 7.04	0.275	4 17 44.28
Wed.	28	4 18 40.65	10.152	21 24 40.7	+24.50	3 0.18	0.296	4 21 40.83
Thur.	29	4 22 44.55	10.172	21 34 17.7	23.57	2 52.84	0.316	4 25 37.39
Fri.	30	4 26 48.92	10.191	21 43 32.3	22.64	2 45.03	0.335	4 29 33.95
Sat.	31	4 30 53.74	10.210	21 52 24.4	21.70	2 36.76	0.354	4 33 30.51
SUN.	32	4 34 59.01	10.228	N.22 0 53.6	+20.74	2 28.05	0.371	4 37 27.06

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 Hour.
$+9^s.8565$.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S True Longitude. λ	THE SUN'S True Longitude. λ′	Diff. for 1 Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		° ′ ″	′ ″	″	″			h m s
1	121	40 29 58.4	29 43.4	145.54	−0.22	0.003 4438	+46.1	21 21 15.73
2	122	41 28 10.6	27 55.4	145.47	−0.09	0.003 5536	45.5	21 17 19.82
3	123	42 26 21.2	26 5.8	145.40	+0.04	0.003 6620	44.8	21 13 23.91
4	124	43 24 30.2	24 14.7	145.34	+0.16	0.003 7689	+44.1	21 9 28.00
5	125	44 22 37.6	22 22.0	145.27	0.28	0.003 8741	43.4	21 5 32.09
6	126	45 20 43.4	20 27.7	145.21	0.37	0.003 9775	42.7	21 1 36.18
7	127	46 18 47.6	18 31.7	145.14	+0.44	0.004 0792	+42.0	20 57 40.26
8	128	47 16 50.1	16 34.0	145.07	0.49	0.004 1790	41.2	20 53 44.35
9	129	48 14 50.8	14 34.6	145.00	0.51	0.004 2770	40.5	20 49 48.44
10	130	49 12 49.8	12 33.4	144.92	+0.50	0.004 3733	+39.8	20 45 52.53
11	131	50 10 47.0	10 30.4	144.84	0.46	0.004 4679	39.1	20 41 56.62
12	132	51 8 42.4	8 25.6	144.77	0.38	0.004 5609	38.4	20 38 0.71
13	133	52 6 35.9	6 18.9	144.69	+0.28	0.004 6524	+37.8	20 34 4.80
14	134	53 4 27.6	4 10.5	144.62	0.15	0.004 7425	37.3	20 30 8.89
15	135	54 2 17.5	2 0.3	144.54	+0.02	0.004 8313	36.8	20 26 12.98
16	136	54 60 5.7	59 48.3	144.47	−0.13	0.004 9190	+36.3	20 22 17.07
17	137	55 57 52.3	57 34.7	144.40	0.27	0.005 0057	35.9	20 18 21.16
18	138	56 55 37.3	55 19.5	144.34	0.40	0.005 0914	35.5	20 14 25.25
19	139	57 53 20.8	53 2.8	144.28	−0.50	0.005 1762	+35.1	20 10 29.34
20	140	58 51 2.8	50 44.7	144.23	0.59	0.005 2601	34.7	20 6 33.42
21	141	59 48 43.5	48 25.3	144.17	0.66	0.005 3431	34.4	20 2 37.51
22	142	60 46 23.0	46 4.6	144.12	−0.69	0.005 4251	+34.0	19 58 41.60
23	143	61 44 1.4	43 42.8	144.07	0.69	0.005 5060	33.5	19 54 45.69
24	144	62 41 38.7	41 20.0	144.03	0.67	0.005 5857	33.0	19 50 49.78
25	145	63 39 15.0	38 56.1	143.99	−0.61	0.005 6642	+32.4	19 46 53.86
26	146	64 36 50.3	36 31.2	143.95	0.54	0.005 7413	31.8	19 42 57.95
27	147	65 34 24.7	34 5.4	143.91	0.44	0.005 8168	31.1	19 39 2.04
28	148	66 31 58.3	31 38.8	143.88	−0.33	0.005 8907	+30.4	19 35 6.13
29	149	67 29 31.0	29 11.3	143.84	0.22	0.005 9629	29.6	19 31 10.22
30	150	68 27 2.8	26 42.9	143.81	−0.10	0.006 0332	28.8	19 27 14.30
31	151	69 24 33.8	24 13.7	143.77	+0.03	0.006 1015	28.0	19 23 18.39
32	152	70 22 3.9	21 43.7	143.74	+0.14	0.006 1677	+27.1	19 19 22.48

Note.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ′ are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
$-9^{s}.8296$.
(Table II.)

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	14 48.4	14 49.8	54 14.48	+0.365	54 19.91	+0.536	21 8.6	1.64	24.8
2	14 51.9	14 54.4	54 27.31	0.695	54 36.51	0.836	21 48.0	1.67	25.8
3	14 57.3	15 0.6	54 47.29	0.958	54 59.43	1.063	22 28.9	1.75	26.8
4	15 4.2	15 8.1	55 12.73	+1.149	55 26.94	+1.215	23 12.3	1.88	27.8
5	15 12.2	15 16.4	55 41.84	1.264	55 57.21	1.295	23 59.2	2.04	28.8
6	15 20.6	15 24.9	56 12.85	1.308	56 28.56	1.307	☌	. .	0.1
7	15 29.2	15 33.4	56 44.18	+1.293	56 59.55	+1.266	0 50.5	2.23	1.1
8	15 37.4	15 41.4	57 14.56	1.233	57 29.13	1.194	1 46.1	2.40	2.1
9	15 45.2	15 48.9	57 43.19	1.148	57 56.66	1.097	2 45.1	2.49	3.1
10	15 52.4	15 55.7	58 9.51	+1.043	58 21.70	+0.988	3 45.4	2.50	4.1
11	15 58.9	16 1.8	58 33.23	0.931	58 44.05	0.871	4 44.6	2.42	5.1
12	16 4.6	16 7.1	58 54.11	0.803	59 3.32	0.730	5 41.0	2.28	6.1
13	16 9.3	16 11.3	59 11.57	+0.645	59 18.74	+0.549	6 34.1	2.14	7.1
14	16 12.9	16 14.1	59 24.69	0.441	59 29.24	0.316	7 24.3	2.05	8.1
15	16 14.9	16 15.3	59 32.20	+0.177	59 33.40	+0.021	8 12.7	2.00	9.1
16	16 15.1	16 14.3	59 32.64	−0.150	59 29.76	−0.332	9 0.8	2.02	10.1
17	16 12.9	16 10.9	59 24.63	0.523	59 17.20	0.716	9 49.8	2.08	11.1
18	16 8.2	16 4.9	59 7.45	0.908	58 55.42	1.094	10 40.9	2.19	12.1
19	16 1.0	15 56.7	58 41.25	−1.265	58 25.13	−1.417	11 34.9	2.31	13.1
20	15 51.8	15 46.6	58 7.33	1.545	57 48.15	1.647	12 31.5	2.40	14.1
21	15 41.1	15 35.4	57 27.94	1.716	57 7.08	1.753	13 29.6	2.42	15.1
22	15 29.7	15 24.0	56 46.00	−1.754	56 25.09	−1.725	14 27.1	2.36	16.1
23	15 18.4	15 13.1	56 4.74	1.662	55 45.30	1.572	15 22.2	2.22	17.1
24	15 8.1	15 3.6	55 27.13	1.452	55 10.53	1.309	16 13.4	2.05	18.1
25	14 59.6	14 56.1	54 55.77	−1.148	54 43.05	−0.970	17 0.6	1.89	19.1
26	14 53.3	14 51.1	54 32.57	0.775	54 24.50	0.570	17 44.2	1.76	20.1
27	14 49.6	14 48.8	54 18.93	−0.357	54 15.93	−0.143	18 25.2	1.67	21.1
28	14 48.6	14 49.2	54 15.52	+0.073	54 17.68	+0.287	19 4.6	1.63	22.1
29	14 50.5	14 52.4	54 22.38	0.495	54 29.52	0.694	19 43.8	1.64	23.1
30	14 55.0	14 58.2	54 38.99	0.881	54 50.63	1.056	20 23.8	1.70	24.1
31	15 1.9	15 6.1	55 4.26	1.211	55 19.62	1.345	21 5.9	1.82	25.1
32	15 10.7	15 15.6	55 36.44	+1.455	55 54.44	+1.542	21 51.4	1.98	26.1

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 1.					SATURDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	23 10 3.66	1.7636	S. 6 59 58.8	13.874	0	0 34 41.14	1.7908	N. 4 26 8.0	14.429
1	23 11 49.44	1.7625	6 46 5.5	13.903	1	0 36 28.66	1.7932	4 40 33.5	14.422
2	23 13 35.16	1.7614	6 32 10.4	13.932	2	0 38 16.33	1.7957	4 54 58.6	14.414
3	23 15 20.81	1.7603	6 18 13.7	13.958	3	0 40 4.15	1.7982	5 9 23.2	14.406
4	23 17 6.40	1.7594	6 4 15.4	13.985	4	0 41 52.12	1.8009	5 23 47.3	14.396
5	23 18 51.94	1.7586	5 50 15.5	14.011	5	0 43 40.26	1.8037	5 38 10.7	14.384
6	23 20 37.43	1.7578	5 36 14.1	14.035	6	0 45 28.56	1.8063	5 52 33.4	14.372
7	23 22 22.88	1.7571	5 22 11.3	14.059	7	0 47 17.02	1.8092	6 6 55.4	14.360
8	23 24 8.28	1.7563	5 8 7.0	14.083	8	0 49 5.66	1.8122	6 21 16.6	14.347
9	23 25 53.64	1.7558	4 54 1.3	14.106	9	0 50 54.48	1.8152	6 35 37.0	14.333
10	23 27 38.97	1.7553	4 39 54.3	14.128	10	0 52 43.48	1.8182	6 49 56.5	14.318
11	23 29 24.28	1.7549	4 25 46.0	14.149	11	0 54 32.66	1.8213	7 4 15.1	14.302
12	23 31 9.56	1.7545	4 11 36.4	14.170	12	0 56 22.04	1.8246	7 18 32.7	14.284
13	23 32 54.82	1.7542	3 57 25.6	14.190	13	0 58 11.61	1.8278	7 32 49.2	14.266
14	23 34 40.07	1.7540	3 43 13.6	14.209	14	1 0 1.38	1.8312	7 47 4.6	14.247
15	23 36 25.30	1.7538	3 29 0.5	14.228	15	1 1 51.36	1.8347	8 1 18.9	14.227
16	23 38 10.53	1.7537	3 14 46.2	14.247	16	1 3 41.54	1.8382	8 15 31.9	14.207
17	23 39 55.75	1.7537	3 0 30.9	14.263	17	1 5 31.94	1.8418	8 29 43.7	14.186
18	23 41 40.98	1.7538	2 46 14.6	14.280	18	1 7 22.55	1.8454	8 43 54.2	14.163
19	23 43 26.21	1.7540	2 31 57.3	14.296	19	1 9 13.39	1.8492	8 58 3.2	14.138
20	23 45 11.46	1.7542	2 17 39.1	14.311	20	1 11 4.45	1.8529	9 12 10.7	14.113
21	23 46 56.72	1.7545	2 3 20.0	14.326	21	1 12 55.74	1.8568	9 26 16.7	14.088
22	23 48 42.00	1.7549	1 49 0.0	14.339	22	1 14 47.27	1.8608	9 40 21.2	14.061
23	23 50 27.31	1.7554	S. 1 34 39.3	14.352	23	1 16 39.04	1.8648	N. 9 54 24.0	14.033
	FRIDAY 2.					SUNDAY 4.			
0	23 52 12.65	1.7559	S. 1 20 17.8	14.364	0	1 18 31.05	1.8689	N. 10 8 25.1	14.004
1	23 53 58.02	1.7565	1 5 55.6	14.376	1	1 20 23.31	1.8731	10 22 24.5	13.974
2	23 55 43.43	1.7572	0 51 32.7	14.387	2	1 22 15.82	1.8773	10 36 22.0	13.943
3	23 57 28.88	1.7579	0 37 9.2	14.397	3	1 24 8.59	1.8817	10 50 17.6	13.911
4	23 59 14.38	1.7587	0 22 45.1	14.406	4	1 26 1.62	1.8860	11 4 11.3	13.878
5	0 0 59.93	1.7596	S. 0 8 20.5	14.414	5	1 27 54.91	1.8904	11 18 2.9	13.843
6	0 2 45.53	1.7606	N. 0 6 4.6	14.422	6	1 29 48.47	1.8950	11 31 52.5	13.808
7	0 4 31.20	1.7617	0 20 30.2	14.429	7	1 31 42.31	1.8996	11 45 39.9	13.772
8	0 6 16.93	1.7628	0 34 56.2	14.436	8	1 33 36.42	1.9043	11 59 25.1	13.735
9	0 8 2.73	1.7640	0 49 22.5	14.442	9	1 35 30.82	1.9090	12 13 8.1	13.697
10	0 9 48.61	1.7652	1 3 49.1	14.446	10	1 37 25.50	1.9138	12 26 48.7	13.657
11	0 11 34.56	1.7666	1 18 16.0	14.450	11	1 39 20.47	1.9187	12 40 26.9	13.616
12	0 13 20.60	1.7680	1 32 43.1	14.453	12	1 41 15.74	1.9237	12 54 2.6	13.574
13	0 15 6.72	1.7695	1 47 10.3	14.455	13	1 43 11.31	1.9287	13 7 35.8	13.531
14	0 16 52.94	1.7711	2 1 37.7	14.457	14	1 45 7.18	1.9337	13 21 6.3	13.487
15	0 18 39.25	1.7727	2 16 5.2	14.458	15	1 47 3.35	1.9388	13 34 34.2	13.442
16	0 20 25.66	1.7744	2 30 32.7	14.458	16	1 48 59.84	1.9441	13 47 59.3	13.395
17	0 22 12.18	1.7762	2 45 0.2	14.457	17	1 50 56.64	1.9493	14 1 21.6	13.347
18	0 23 58.81	1.7781	2 59 27.6	14.456	18	1 52 53.76	1.9547	14 14 41.0	13.298
19	0 25 45.55	1.7800	3 13 54.9	14.454	19	1 54 51.20	1.9601	14 27 57.4	13.248
20	0 27 32.41	1.7821	3 28 22.1	14.451	20	1 56 48.97	1.9656	14 41 10.7	13.197
21	0 29 19.40	1.7842	3 42 49.0	14.447	21	1 58 47.07	1.9711	14 54 21.0	13.145
22	0 31 6.51	1.7863	3 57 15.7	14.442	22	2 0 45.50	1.9767	15 7 28.1	13.091
23	0 32 53.76	1.7886	4 11 42.0	14.436	23	2 2 44.27	1 9823	15 20 31.9	13.035
24	0 34 41.14	1.7908	N. 4 26 8.0	14.429	24	2 4 43.38	1.9880	N. 15 33 32.3	12.978

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 5.			
	h m s	s	° ′ ″	″
0	2 4 43.38	1.9880	N.15 33 32.3	12.978
1	2 6 42.83	1.9938	15 46 29.3	12.922
2	2 8 42.64	1.9997	15 59 22.9	12.863
3	2 10 42.79	2.0055	16 12 12.9	12.802
4	2 12 43.30	2.0115	16 24 59.2	12.741
5	2 14 44.17	2.0175	16 37 41.8	12.678
6	2 16 45.40	2.0236	16 50 20.6	12.614
7	2 18 47.00	2.0297	17 2 55.5	12.548
8	2 20 48.97	2.0359	17 15 26.4	12.482
9	2 22 51.31	2.0421	17 27 53.3	12.414
10	2 24 54.02	2.0483	17 40 16.1	12.345
11	2 26 57.11	2.0547	17 52 34.7	12.274
12	2 29 0.58	2.0611	18 4 49.0	12.202
13	2 31 4.44	2.0675	18 16 58.9	12.128
14	2 33 8.68	2.0739	18 29 4.4	12.054
15	2 35 13.31	2.0804	18 41 5.4	11.978
16	2 37 18.33	2.0870	18 53 1.8	11.900
17	2 39 23.75	2.0937	19 4 53.5	11.821
18	2 41 29.57	2.1003	19 16 40.3	11.740
19	2 43 35.79	2.1070	19 28 22.2	11.658
20	2 45 42.41	2.1137	19 39 59.2	11.575
21	2 47 49.43	2.1204	19 51 31.2	11.491
22	2 49 56.86	2.1272	20 2 58.1	11.404
23	2 52 4.70	2.1340	N.20 14 19.7	11.317
	TUESDAY 6.			
0	2 54 12.94	2.1408	N.20 25 36.1	11.228
1	2 56 21.60	2.1477	20 36 47.1	11.137
2	2 58 30.67	2.1546	20 47 52.6	11.045
3	3 0 40.15	2.1616	20 58 52.5	10.952
4	3 2 50.06	2.1686	21 9 46.8	10.857
5	3 5 0.38	2.1755	21 20 35.3	10.760
6	3 7 11.12	2.1825	21 31 18.0	10.662
7	3 9 22.28	2.1895	21 41 54.8	10.563
8	3 11 33.86	2.1965	21 52 25.6	10.462
9	3 13 45.86	2.2036	22 2 50.3	10.360
10	3 15 58.29	2.2107	22 13 8.8	10.257
11	3 18 11.14	2.2177	22 23 21.1	10.152
12	3 20 24.42	2.2248	22 33 27.0	10.044
13	3 22 38.12	2.2318	22 43 26.4	9.936
14	3 24 52.24	2.2389	22 53 19.3	9.826
15	3 27 6.79	2.2461	23 3 5.5	9.715
16	3 29 21.77	2.2532	23 12 45.1	9.602
17	3 31 37.17	2.2602	23 22 17.8	9.487
18	3 33 52.99	2.2673	23 31 43.6	9.372
19	3 36 9.24	2.2743	23 41 2.4	9.255
20	3 38 25.91	2.2813	23 50 14.2	9.137
21	3 40 43.00	2.2884	23 59 18.8	9.016
22	3 43 0.52	2.2954	24 8 16.1	8.894
23	3 45 18.45	2.3023	24 17 6.1	8.771
24	3 47 36.80	2.3093	N.24 25 48.6	8.646

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 7.			
	h m s	s	° ′ ″	″
0	3 47 36.80	2.3093	N.24 25 48.6	8.646
1	3 49 55.57	2.3162	24 34 23.6	8.520
2	3 52 14.75	2.3231	24 42 51.0	8.392
3	3 54 34.34	2.3300	24 51 10.7	8.263
4	3 56 54.35	2.3369	24 59 22.6	8.132
5	3 59 14.77	2.3437	25 7 26.6	8.000
6	4 1 35.59	2.3504	25 15 22.6	7.867
7	4 3 56.82	2.3572	25 23 10.6	7.732
8	4 6 18.45	2.3638	25 30 50.4	7.595
9	4 8 40.48	2.3705	25 38 22.0	7.457
10	4 11 2.91	2.3771	25 45 45.3	7.318
11	4 13 25.73	2.3836	25 53 0.2	7.178
12	4 15 48.94	2.3900	26 0 6.7	7.036
13	4 18 12.53	2.3964	26 7 4.5	6.892
14	4 20 36.51	2.4028	26 13 53.7	6.747
15	4 23 0.87	2.4091	26 20 34.2	6.601
16	4 25 25.60	2.4152	26 27 5.8	6.453
17	4 27 50.70	2.4213	26 33 28.6	6.305
18	4 30 16.16	2.4273	26 39 42.4	6.155
19	4 32 41.98	2.4333	26 45 47.2	6.003
20	4 35 8.16	2.4392	26 51 42.8	5.850
21	4 37 34.69	2.4450	26 57 29.2	5.697
22	4 40 1.56	2.4507	27 3 6.4	5.542
23	4 42 28.77	2.4563	N.27 8 34.2	5.385
	THURSDAY 8.			
0	4 44 56.32	2.4619	N.27 13 52.6	5.227
1	4 47 24.20	2.4673	27 19 1.5	5.068
2	4 49 52.40	2.4726	27 24 0.8	4.908
3	4 52 20.91	2.4778	27 28 50.5	4.747
4	4 54 49.73	2.4829	27 33 30.4	4.584
5	4 57 18.86	2.4880	27 38 0.6	4.422
6	4 59 48.29	2.4928	27 42 21.0	4.258
7	5 2 18.00	2.4976	27 46 31.5	4.092
8	5 4 48.00	2.5023	27 50 32.0	3.925
9	5 7 18.28	2.5068	27 54 22.5	3.757
10	5 9 48.82	2.5112	27 58 2.9	3.588
11	5 12 19.63	2.5156	28 1 33.1	3.419
12	5 14 50.69	2.5198	28 4 53.2	3.249
13	5 17 22.00	2.5238	28 8 3.0	3.078
14	5 19 53.54	2.5277	28 11 2.5	2.906
15	5 22 25.32	2.5315	28 13 51.7	2.733
16	5 24 57.32	2.5351	28 16 30.4	2.558
17	5 27 29.53	2.5386	28 18 58.7	2.384
18	5 30 1.95	2.5420	28 21 16.5	2.209
19	5 32 34.57	2.5452	28 23 23.8	2.033
20	5 35 7.38	2.5483	28 25 20.5	1.857
21	5 37 40.37	2.5512	28 27 6.6	1.679
22	5 40 13.53	2.5541	28 28 42.0	1.501
23	5 42 46.86	2.5568	28 30 6.7	1.322
24	5 45 20.34	2.5593	N.28 31 20.7	1.143

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 9.					SUNDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	5 45 20.34	2.5593	N.28 31 20.7	1.143	0	7 48 12.28	2.5066	N.25 57 28.6	7.439
1	5 47 53.97	2.5616	28 32 23.9	0.963	1	7 50 42.55	2.5023	25 49 57.3	7.604
2	5 50 27.73	2.5637	28 33 16.3	0.783	2	7 53 12.56	2.4981	25 42 16.1	7.768
3	5 53 1.62	2.5658	28 33 57.9	0.602	3	7 55 42.32	2.4938	25 34 25.2	7.930
4	5 55 35.63	2.5677	28 34 28.6	0.421	4	7 58 11.82	2.4894	25 26 24.5	8.092
5	5 58 9.75	2.5695	28 34 48.4	0.240	5	8 0 41.05	2.4850	25 18 14.1	8.253
6	6 0 43.97	2.5711	28 34 57.4	+0.058	6	8 3 10.01	2.4804	25 9 54.1	8.413
7	6 3 18.28	2.5725	28 34 55.4	−0.124	7	8 5 38.70	2.4758	25 1 24.6	8.571
8	6 5 52.67	2.5737	28 34 42.5	0.306	8	8 8 7.11	2.4712	24 52 45.6	8.728
9	6 8 27.13	2.5749	28 34 18.7	0.488	9	8 10 35.24	2.4665	24 43 57.2	8.884
10	6 11 1.66	2.5759	28 33 43.9	0.672	10	8 13 3.09	2.4617	24 34 59.5	9.038
11	6 13 36.24	2.5767	28 32 58.1	0.855	11	8 15 30.65	2.4568	24 25 52.6	9.192
12	6 16 10.87	2.5774	28 32 1.3	1.038	12	8 17 57.91	2.4519	24 16 36.4	9.346
13	6 18 45.53	2.5779	28 30 53.5	1.221	13	8 20 24.88	2.4470	24 7 11.1	9.497
14	6 21 20.22	2.5782	28 29 34.8	1.404	14	8 22 51.55	2.4420	23 57 36.8	9.646
15	6 23 54.92	2.5784	28 28 5.0	1.588	15	8 25 17.92	2.4370	23 47 53.6	9.794
16	6 26 29.63	2.5785	28 26 24.2	1.772	16	8 27 43.99	2.4320	23 38 1.5	9.942
17	6 29 4.34	2.5784	28 24 32.4	1.955	17	8 30 9.76	2.4269	23 28 0.6	10.088
18	6 31 39.04	2.5781	28 22 29.6	2.138	18	8 32 35.22	2.4217	23 17 51.0	10.233
19	6 34 13.71	2.5776	28 20 15.8	2.322	19	8 35 0.36	2.4165	23 7 32.7	10.377
20	6 36 48.35	2.5771	28 17 51.0	2.505	20	8 37 25.20	2.4114	22 57 5.8	10.518
21	6 39 22.96	2.5764	28 15 15.2	2.688	21	8 39 49.73	2.4062	22 46 30.5	10.658
22	6 41 57.52	2.5756	28 12 28.5	2.870	22	8 42 13.94	2.4008	22 35 46.8	10.797
23	6 44 32.03	2.5746	N.28 9 30.8	3.052	23	8 44 37.83	2.3956	N.22 24 54.8	10.936
	SATURDAY 10.					MONDAY 12.			
0	6 47 6.47	2.5733	N.28 6 22.2	3.235	0	8 47 1.41	2.3903	N.22 13 54.5	11.072
1	6 49 40.83	2.5720	28 3 2.6	3.417	1	8 49 24.67	2.3850	22 2 46.1	11.207
2	6 52 15.11	2.5706	27 59 32.1	3.598	2	8 51 47.61	2.3797	21 51 29.6	11.341
3	6 54 49.30	2.5690	27 55 50.8	3.779	3	8 54 10.23	2.3744	21 40 5.2	11.473
4	6 57 23.39	2.5673	27 51 58.6	3.960	4	8 56 32.53	2.3691	21 28 32.9	11.603
5	6 59 57.37	2.5654	27 47 55.6	4.141	5	8 58 54.52	2.3638	21 16 52.8	11.732
6	7 2 31.24	2.5634	27 43 41.7	4.321	6	9 1 16.19	2.3585	21 5 5.0	11.861
7	7 5 4.98	2.5612	27 39 17.1	4.499	7	9 3 37.53	2.3532	20 53 9.5	11.987
8	7 7 38.59	2.5589	27 34 41.8	4.678	8	9 5 58.57	2.3478	20 41 6.5	12.112
9	7 10 12.05	2.5565	27 29 55.7	4.857	9	9 8 19.28	2.3426	20 28 56.1	12.235
10	7 12 45.37	2.5541	27 24 59.0	5.034	10	9 10 39.68	2.3373	20 16 38.3	12.357
11	7 15 18.54	2.5514	27 19 51.6	5.212	11	9 12 59.76	2.3320	20 4 13.2	12.478
12	7 17 51.54	2.5486	27 14 33.6	5.388	12	9 15 19.52	2.3267	19 51 40.9	12.597
13	7 20 24.37	2.5457	27 9 5.1	5.563	13	9 17 38.97	2.3215	19 39 1.5	12.714
14	7 22 57.02	2.5427	27 3 26.1	5.738	14	9 19 58.10	2.3163	19 26 15.1	12.830
15	7 25 29.49	2.5395	26 57 36.6	5.912	15	9 22 16.92	2.3112	19 13 21.9	12.944
16	7 28 1.76	2.5362	26 51 36.7	6.085	16	9 24 35.44	2.3060	19 0 21.9	13.057
17	7 30 33.84	2.5329	26 45 26.4	6.257	17	9 26 53.64	2.3008	18 47 15.1	13.169
18	7 33 5.71	2.5294	26 39 5.8	6.428	18	9 29 11.54	2.2957	18 34 1.6	13.279
19	7 35 37.37	2.5258	26 32 35.0	6.599	19	9 31 29.13	2.2907	18 20 41.6	13.388
20	7 38 8.81	2.5221	26 25 53.9	6.769	20	9 33 46.42	2.2857	18 7 15.1	13.495
21	7 40 40.02	2.5183	26 19 2.7	6.938	21	9 36 3.41	2.2807	17 53 42.2	13.600
22	7 43 11.01	2.5145	26 12 1.4	7.106	22	9 38 20.10	2.2757	17 40 3.1	13.703
23	7 45 41.76	2.5106	26 4 50.0	7.273	23	9 40 36.49	2.2708	17 26 17.8	13.807
24	7 48 12.28	2.5066	N.25 57 28.6	7.439	24	9 42 52.59	2.2659	N.17 12 26.3	13.908

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 13.					THURSDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	9 42 52.59	2.2659	N.17 12 26.3	13.908	0	11 27 10.96	2.1087	N. 4 38 7.1	16.930
1	9 45 8.40	2.2611	16 58 28.9	14.006	1	11 29 17.44	2.1074	4 21 10.5	16.955
2	9 47 23.92	2.2563	16 44 25.6	14.104	2	11 31 23.85	2.1062	4 4 12.5	16.978
3	9 49 39.15	2.2515	16 30 16.4	14.201	3	11 33 30.19	2.1051	3 47 13.1	17.001
4	9 51 54.10	2.2468	16 16 1.5	14.295	4	11 35 36.46	2.1041	3 30 12.4	17.082
5	9 54 8.77	2.2422	16 1 41.0	14.388	5	11 37 42.68	2.1032	3 13 10.5	17.040
6	9 56 23.17	2.2377	15 47 15.0	14.479	6	11 39 48.84	2.1023	2 56 7.6	17.057
7	9 58 37.29	2.2332	15 32 43.5	14.569	7	11 41 54.95	2.1015	2 39 3.7	17.073
8	10 0 51.15	2.2287	15 18 6.7	14.657	8	11 44 1.02	2.1008	2 21 58.8	17.088
9	10 3 4.74	2.2242	15 3 24.6	14.744	9	11 46 7.05	2.1002	2 4 53.1	17.101
10	10 5 18.06	2.2198	14 48 37.4	14.830	10	11 48 13.04	2.0997	1 47 46.7	17.112
11	10 7 31.12	2.2156	14 33 45.0	14.914	11	11 50 19.01	2.0992	1 30 39.7	17.122
12	10 9 43.93	2.2113	14 18 47.7	14.996	12	11 52 24.95	2.0989	1 13 32.1	17.130
13	10 11 56.48	2.2072	14 3 45.5	15.077	13	11 54 30.88	2.0987	0 56 24.1	17.136
14	10 14 8.79	2.2032	13 48 38.5	15.156	14	11 56 36.80	2.0986	0 39 15.8	17.141
15	10 16 20.86	2.1991	13 33 26.8	15.233	15	11 58 42.71	2.0985	0 22 7.2	17.144
16	10 18 32.68	2.1951	13 18 10.5	15.309	16	12 0 48.62	2.0986	N. 0 4 58.4	17.147
17	10 20 44.27	2.1912	13 2 49.7	15.384	17	12 2 54.54	2.0987	S. 0 12 10.4	17.147
18	10 22 55.62	2.1873	12 47 24.4	15.457	18	12 5 0.47	2.0989	0 29 19.2	17.145
19	10 25 6.75	2.1836	12 31 54.8	15.528	19	12 7 6.41	2.0992	0 46 27.9	17.142
20	10 27 17.65	2.1798	12 16 21.0	15.598	20	12 9 12.37	2.0996	1 3 36.3	17.138
21	10 29 28.33	2.1762	12 0 43.0	15.667	21	12 11 18.36	2.1000	1 20 44.4	17.132
22	10 31 38.80	2.1727	11 45 0.9	15.734	22	12 13 24.37	2.1005	1 37 52.1	17.125
23	10 33 49.05	2.1692	N.11 29 14.9	15.799	23	12 15 30.42	2.1012	S. 1 54 59.4	17.116
	WEDNESDAY 14.					FRIDAY 16.			
0	10 35 59.10	2.1658	N.11 13 25.0	15.863	0	12 17 36.52	2.1020	S. 2 12 6.0	17.104
1	10 38 8.95	2.1625	10 57 31.3	15.925	1	12 19 42.66	2.1028	2 29 11.9	17.092
2	10 40 18.60	2.1593	10 41 34.0	15.985	2	12 21 48.86	2.1037	2 46 17.0	17.078
3	10 42 28.06	2.1562	10 25 33.1	16.045	3	12 23 55.11	2.1048	3 3 21.3	17.063
4	10 44 37.34	2.1531	10 9 28.6	16.103	4	12 26 1.43	2.1058	3 20 24.6	17.046
5	10 46 46.43	2.1500	9 53 20.7	16.159	5	12 28 7.81	2.1069	3 37 26.8	17.027
6	10 48 55.34	2.1471	9 37 9.5	16.213	6	12 30 14.26	2.1082	3 54 27.8	17.007
7	10 51 4.08	2.1442	9 20 55.1	16.266	7	12 32 20.79	2.1096	4 11 27.6	16.985
8	10 53 12.65	2.1414	9 4 37.6	16.318	8	12 34 27.41	2.1111	4 28 26.0	16.961
9	10 55 21.05	2.1388	8 48 17.0	16.368	9	12 36 34.12	2.1126	4 45 22.9	16.936
10	10 57 29.30	2.1362	8 31 53.5	16.416	10	12 38 40.92	2.1141	5 2 18.3	16.910
11	10 59 37.39	2.1337	8 15 27.1	16.463	11	12 40 47.81	2.1158	5 19 12.1	16.882
12	11 1 45.34	2.1313	7 58 58.0	16.508	12	12 42 54.81	2.1176	5 36 4.1	16.852
13	11 3 53.14	2.1289	7 42 26.2	16.552	13	12 45 1.92	2.1194	5 52 54.3	16.820
14	11 6 0.81	2.1267	7 25 51.8	16.593	14	12 47 9.14	2.1213	6 9 42.5	16.787
15	11 8 8.34	2.1244	7 9 15.0	16.633	15	12 49 16.48	2.1233	6 26 28.7	16.752
16	11 10 15.74	2.1223	6 52 35.8	16.672	16	12 51 23.94	2.1254	6 43 12.7	16.716
17	11 12 23.02	2.1203	6 35 54.3	16.711	17	12 53 31.53	2.1276	6 59 54.6	16.678
18	11 14 30.18	2.1184	6 19 10.5	16.747	18	12 55 39.25	2.1298	7 16 34.1	16.638
19	11 16 37.23	2.1166	6 2 24.7	16.781	19	12 57 47.10	2.1321	7 33 11.2	16.597
20	11 18 44.17	2.1148	5 45 36.8	16.813	20	12 59 55.10	2.1346	7 49 45.8	16.554
21	11 20 51.00	2.1131	5 28 47.1	16.844	21	13 2 3.25	2.1370	8 6 17.7	16.510
22	11 22 57.74	2.1116	5 11 55.5	16.875	22	13 4 11.54	2.1395	8 22 46.9	16.464
23	11 25 4.39	2.1102	4 55 2.1	16.903	23	13 6 19.99	2.1422	8 39 13.4	16.417
24	11 27 10.96	2.1087	N. 4 38 7.1	16.930	24	13 8 28.60	2.1449	S. 8 55 36.9	16.367

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 17.					MONDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	13 8 28.60	2.1449	S. 8 55 36.9	16.367	0	14 55 39.31	2.3360	S. 20 33 35.1	12.102
1	13 10 37.38	2.1477	9 11 57.4	16.316	1	14 57 59.61	2.3406	20 45 37.4	11.975
2	13 12 46.32	2.1505	9 28 14.8	16.263	2	15 0 20.18	2.3451	20 57 32.1	11.847
3	13 14 55.44	2.1534	9 44 29.0	16.209	3	15 2 41.02	2.3497	21 9 19.0	11.717
4	13 17 4.73	2.1563	10 0 39.9	16.154	4	15 5 2.14	2.3542	21 20 58.1	11.585
5	13 19 14.20	2.1594	10 16 47.5	16.097	5	15 7 23.52	2.3586	21 32 29.2	11.452
6	13 21 23.86	2.1626	10 32 51.5	16.037	6	15 9 45.17	2.3631	21 43 52.4	11.319
7	13 23 33.71	2.1658	10 48 51.9	15.977	7	15 12 7.09	2.3675	21 55 7.5	11.184
8	13 25 43.75	2.1690	11 4 48.6	15.914	8	15 14 29.27	2.3718	22 6 14.5	11.047
9	13 27 53.99	2.1723	11 20 41.6	15.850	9	15 16 51.71	2.3763	22 17 13.3	10.910
10	13 30 4.43	2.1757	11 36 30.7	15.785	10	15 19 14.42	2.3807	22 28 3.7	10.771
11	13 32 15.07	2.1792	11 52 15.8	15.717	11	15 21 37.39	2.3849	22 38 45.7	10.630
12	13 34 25.93	2.1827	12 7 56.8	15.648	12	15 24 0.61	2.3891	22 49 19.3	10.488
13	13 36 37.00	2.1862	12 23 33.6	15.578	13	15 26 24.08	2.3933	22 59 44.4	10.346
14	13 38 48.28	2.1898	12 39 6.1	15.506	14	15 28 47.81	2.3976	23 10 0.8	10.202
15	13 40 59.78	2.1935	12 54 34.3	15.432	15	15 31 11.79	2.4017	23 20 8.5	10.056
16	13 43 11.50	2.1973	13 9 58.0	15.357	16	15 33 36.01	2.4057	23 30 7.5	9.910
17	13 45 23.45	2.2011	13 25 17.1	15.279	17	15 36 0.48	2.4097	23 39 57.7	9.762
18	13 47 35.63	2.2049	13 40 31.5	15.201	18	15 38 25.18	2.4137	23 49 38.9	9.613
19	13 49 48.04	2.2088	13 55 41.2	15.121	19	15 40 50.12	2.4176	23 59 11.2	9.463
20	13 52 0.69	2.2128	14 10 46.0	15.038	20	15 43 15.29	2.4214	24 8 34.5	9.312
21	13 54 13.57	2.2168	14 25 45.8	14.955	21	15 45 40.69	2.4252	24 17 48.7	9.160
22	13 56 26.70	2.2208	14 40 40.6	14.870	22	15 48 6.31	2.4288	24 26 53.7	9.007
23	13 58 40.07	2.2248	S. 14 55 30.2	14.783	23	15 50 32.15	2.4325	S. 24 35 49.5	8.852
	SUNDAY 18.					TUESDAY 20.			
0	14 0 53.68	2.2289	S. 15 10 14.6	14.695	0	15 52 58.21	2.4361	S. 24 44 36.0	8.697
1	14 3 7.54	2.2332	15 24 53.6	14.605	1	15 55 24.48	2.4395	24 53 13.2	8.541
2	14 5 21.66	2.2374	15 39 27.2	14.513	2	15 57 50.95	2.4429	25 1 40.9	8.383
3	14 7 36.03	2.2416	15 53 55.2	14.420	3	16 0 17.63	2.4462	25 9 59.2	8.226
4	14 9 50.65	2.2459	16 8 17.6	14.325	4	16 2 44.50	2.4494	25 18 8.0	8.067
5	14 12 5.54	2.2502	16 22 34.2	14.228	5	16 5 11.56	2.4526	25 26 7.2	7.906
6	14 14 20.68	2.2546	16 36 45.0	14.131	6	16 7 38.81	2.4557	25 33 56.7	7.745
7	14 16 36.09	2.2590	16 50 49.9	14.031	7	16 10 6.24	2.4586	25 41 36.6	7.584
8	14 18 51.76	2.2634	17 4 48.7	13.929	8	16 12 33.84	2.4614	25 49 6.8	7.422
9	14 21 7.70	2.2678	17 18 41.4	13.827	9	16 15 1.61	2.4642	25 56 27.2	7.258
10	14 23 23.90	2.2722	17 32 28.0	13.723	10	16 17 29.55	2.4669	26 3 37.8	7.094
11	14 25 40.37	2.2767	17 46 8.2	13.617	11	16 19 57.64	2.4694	26 10 38.5	6.929
12	14 27 57.11	2.2812	17 59 42.0	13.509	12	16 22 25.88	2.4719	26 17 29.3	6.764
13	14 30 14.12	2.2857	18 13 9.3	13.401	13	16 24 54.27	2.4743	26 24 10.2	6.598
14	14 32 31.40	2.2903	18 26 30.1	13.291	14	16 27 22.79	2.4765	26 30 41.0	6.431
15	14 34 48.96	2.2949	18 39 44.2	13.178	15	16 29 51.45	2.4787	26 37 1.9	6.264
16	14 37 6.79	2.2995	18 52 51.5	13.064	16	16 32 20.23	2.4806	26 43 12.7	6.096
17	14 39 24.90	2.3041	19 5 51.9	12.948	17	16 34 49.12	2.4825	26 49 13.4	5.927
18	14 41 43.28	2.3086	19 18 45.3	12.832	18	16 37 18.13	2.4843	26 55 4.0	5.758
19	14 44 1.93	2.3132	19 31 31.7	12.714	19	16 39 47.24	2.4860	27 0 44.4	5.589
20	14 46 20.86	2.3177	19 44 11.0	12.595	20	16 42 16.45	2.4876	27 6 14.7	5.419
21	14 48 40.06	2.3223	19 56 43.1	12.474	21	16 44 45.75	2.4890	27 11 34.7	5.248
22	14 50 59.54	2.3269	20 9 7.9	12.351	22	16 47 15.13	2.4903	27 16 44.5	5.078
23	14 53 19.29	2.3314	20 21 25.2	12.227	23	16 49 44.59	2.4915	27 21 44.1	4.907
24	14 55 39.31	2.3360	S. 20 33 35.1	12.102	24	16 52 14.11	2.4925	S. 27 26 33.4	4.736

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 21.					**FRIDAY 23.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	16 52 14.11	2.4925	S. 27 26 33.4	4.736	0	18 50 34.57	2.3893	S. 27 57 40.7	3.273
1	16 54 43.69	2.4934	27 31 12.4	4.564	1	18 52 57.78	2.3843	27 54 19.8	3.424
2	16 57 13.32	2.4943	27 35 41.1	4.392	2	18 55 20.69	2.3792	27 50 49.8	3.575
3	16 59 43.00	2.4950	27 39 59.4	4.219	3	18 57 43.29	2.3741	27 47 10.8	3.723
4	17 2 12.72	2.4955	27 44 7.4	4.047	4	19 0 5.58	2.3688	27 43 23.0	3.871
5	17 4 42.46	2.4958	27 48 5.1	3.875	5	19 2 27.55	2.3635	27 39 26.3	4.018
6	17 7 12.22	2.4962	27 51 52.4	3.702	6	19 4 49.20	2.3581	27 35 20.8	4.164
7	17 9 42.00	2.4963	27 55 29.4	3.529	7	19 7 10.52	2.3525	27 31 6.6	4.309
8	17 12 11.78	2.4963	27 58 55.9	3.356	8	19 9 31.51	2.3470	27 26 43.7	4.453
9	17 14 41.55	2.4962	28 2 12.1	3.184	9	19 11 52.16	2.3414	27 22 12.2	4.596
10	17 17 11.32	2.4959	28 5 18.0	3.011	10	19 14 12.47	2.3357	27 17 32.2	4.737
11	17 19 41.06	2.4955	28 8 13.4	2.838	11	19 16 32.44	2.3299	27 12 43.8	4.877
12	17 22 10.78	2.4950	28 10 58.5	2.665	12	19 18 52.06	2.3241	27 7 47.0	5.016
13	17 24 40.46	2.4943	28 13 33.2	2.492	13	19 21 11.33	2.3182	27 2 41.9	5.154
14	17 27 10.10	2.4935	28 15 57.5	2.319	14	19 23 30.25	2.3123	26 57 28.5	5.292
15	17 29 39.68	2.4925	28 18 11.5	2.147	15	19 25 48.81	2.3063	26 52 6.9	5.427
16	17 32 9.20	2.4914	28 20 15.1	1.974	16	19 28 7.01	2.3003	26 46 37.3	5.561
17	17 34 38.65	2.4902	28 22 8.4	1.802	17	19 30 24.84	2.2942	26 40 59.6	5.695
18	17 37 8.03	2.4889	28 23 51.4	1.631	18	19 32 42.31	2.2881	26 35 13.9	5.827
19	17 39 37.32	2.4874	28 25 24.1	1.458	19	19 34 59.41	2.2819	26 29 20.3	5.958
20	17 42 6.52	2.4857	28 26 46.4	1.287	20	19 37 16.14	2.2757	26 23 18.9	6.088
21	17 44 35.61	2.4840	28 27 58.5	1.117	21	19 39 32.49	2.2694	26 17 9.7	6.217
22	17 47 4.60	2.4822	28 29 0.4	0.947	22	19 41 48.47	2.2632	26 10 52.9	6.344
23	17 49 33.47	2.4801	S. 28 29 52.1	0.776	23	19 44 4.07	2.2568	S. 26 4 28.4	6.471
	THURSDAY 22.					**SATURDAY 24.**			
0	17 52 2.21	2.4779	S. 28 30 33.5	0.606	0	19 46 19.29	2.2505	S. 25 57 56.4	6.596
1	17 54 30.82	2.4757	28 31 4.8	0.437	1	19 48 34.13	2.2442	25 51 16.9	6.719
2	17 56 59.29	2.4732	28 31 25.9	0.268	2	19 50 48.59	2.2378	25 44 30.1	6.842
3	17 59 27.60	2.4706	28 31 36.9	−0.099	3	19 53 2.66	2.2313	25 37 35.9	6.963
4	18 1 55.76	2.4679	28 31 37.8	+0.068	4	19 55 16.35	2.2249	25 30 34.5	7.083
5	18 4 23.75	2.4651	28 31 28.7	0.235	5	19 57 29.65	2.2184	25 23 25.9	7.202
6	18 6 51.57	2.4622	28 31 9.6	0.402	6	19 59 42.56	2.2120	25 16 10.2	7.320
7	18 9 19.21	2.4591	28 30 40.5	0.568	7	20 1 55.09	2.2056	25 8 47.5	7.437
8	18 11 46.66	2.4558	28 30 1.4	0.733	8	20 4 7.23	2.1991	25 1 17.8	7.553
9	18 14 13.91	2.4525	28 29 12.5	0.898	9	20 6 18.98	2.1925	24 53 41.2	7.667
10	18 16 40.96	2.4491	28 28 13.7	1.062	10	20 8 30.33	2.1860	24 45 57.8	7.779
11	18 19 7.80	2.4456	28 27 5.0	1.226	11	20 10 41.30	2.1796	24 38 7.7	7.891
12	18 21 34.43	2.4419	28 25 46.6	1.388	12	20 12 51.88	2.1731	24 30 10.9	8.002
13	18 24 0.83	2.4381	28 24 18.4	1.550	13	20 15 2.07	2.1666	24 22 7.5	8.111
14	18 26 27.00	2.4342	28 22 40.6	1.711	14	20 17 11.87	2.1601	24 13 57.6	8.219
15	18 28 52.93	2.4302	28 20 53.1	1.871	15	20 19 21.28	2.1536	24 5 41.2	8.326
16	18 31 18.62	2.4261	28 18 56.1	2.030	16	20 21 30.30	2.1471	23 57 18.5	8.431
17	18 33 44.06	2.4218	28 16 49.5	2.189	17	20 23 38.93	2.1406	23 48 49.5	8.535
18	18 36 9.24	2.4174	28 14 33.4	2.347	18	20 25 47.17	2.1342	23 40 14.3	8.639
19	18 38 34.15	2.4130	28 12 7.9	2.503	19	20 27 55.03	2.1277	23 31 32.8	8.742
20	18 40 58.80	2.4085	28 9 33.0	2.659	20	20 30 2.50	2.1213	23 22 45.3	8.843
21	18 43 23.17	2.4038	28 6 48.8	2.814	21	20 32 9.59	2.1149	23 13 51.7	8.943
22	18 45 47.26	2.3991	28 3 55.3	2.968	22	20 34 16.29	2.1085	23 4 52.2	9.041
23	18 48 11.06	2.3942	28 0 52.6	3.122	23	20 36 22.61	2.1021	22 55 46.8	9.138
24	18 50 34.57	2.3893	S. 27 57 40.7	3.273	24	20 38 28.54	2.0958	S. 22 46 35.6	9.234

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 25.					TUESDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	20 38 28.54	2.0958	S.22 46 35.6	9.234	0	22 12 32.33	1.8443	S.13 52 43.2	12.635
1	20 40 34.10	2.0895	22 37 18.7	9.329	1	22 14 22.88	1.8406	13 40 3.6	12.683
2	20 42 39.28	2.0832	22 27 56.1	9.423	2	22 16 13.20	1.8369	13 27 21.2	12.731
3	20 44 44.08	2.0769	22 18 27.9	9.517	3	22 18 3.31	1.8333	13 14 35.9	12.778
4	20 46 48.51	2.0707	22 8 54.1	9.608	4	22 19 53.20	1.8298	13 1 47.8	12.824
5	20 48 52.56	2.0644	21 59 14.9	9.699	5	22 21 42.88	1.8263	12 48 57.0	12.869
6	20 50 56.24	2.0582	21 49 30.2	9.789	6	22 23 32.36	1.8229	12 36 3.5	12.914
7	20 52 59.55	2.0522	21 39 40.2	9.877	7	22 25 21.63	1.8195	12 23 7.3	12.958
8	20 55 2.50	2.0461	21 29 45.0	9.963	8	22 27 10.70	1.8163	12 10 8.5	13.002
9	20 57 5.08	2.0400	21 19 44.6	10.050	9	22 28 59.59	1.8132	11 57 7.1	13.044
10	20 59 7.30	2.0339	21 9 39.0	10.135	10	22 30 48.29	1.8101	11 44 3.2	13.085
11	21 1 9.15	2.0279	20 59 28.4	10.219	11	22 32 36.80	1.8070	11 30 56.9	13.126
12	21 3 10.65	2.0221	20 49 12.7	10.302	12	22 34 25.13	1.8041	11 17 48.1	13.166
13	21 5 11.80	2.0162	20 38 52.1	10.384	13	22 36 13.29	1.8012	11 4 37.0	13.205
14	21 7 12.59	2.0103	20 28 26.6	10.465	14	22 38 1.27	1.7983	10 51 23.5	13.244
15	21 9 13.03	2.0044	20 17 56.3	10.544	15	22 39 49.09	1.7957	10 38 7.7	13.282
16	21 11 13.12	1.9987	20 7 21.3	10.623	16	22 41 36.75	1.7930	10 24 49.6	13.320
17	21 13 12.87	1.9930	19 56 41.5	10.702	17	22 43 24.25	1.7904	10 11 29.3	13.356
18	21 15 12.28	1.9873	19 45 57.1	10.778	18	22 45 11.60	1.7879	9 58 6.9	13.391
19	21 17 11.35	1.9817	19 35 8.2	10.853	19	22 46 58.80	1.7854	9 44 42.4	13.427
20	21 19 10.08	1.9761	19 24 14.8	10.928	20	22 48 45.85	1.7830	9 31 15.7	13.462
21	21 21 8.48	1.9706	19 13 16.9	11.002	21	22 50 32.76	1.7808	9 17 47.0	13.495
22	21 23 6.55	1.9651	19 2 14.6	11.074	22	22 52 19.54	1.7786	9 4 16.3	13.528
23	21 25 4.29	1.9597	S.18 51 8.0	11.146	23	22 54 6.19	1.7765	S. 8 50 43.6	13.561
	MONDAY 26.					WEDNESDAY 28.			
0	21 27 1.71	1.9543	S.18 39 57.1	11.217	0	22 55 52.72	1.7744	S. 8 37 9.0	13.592
1	21 28 58.81	1.9491	18 28 42.0	11.286	1	22 57 39.12	1.7724	8 23 32.5	13.623
2	21 30 55.60	1.9438	18 17 22.8	11.354	2	22 59 25.41	1.7706	8 9 54.2	13.653
3	21 32 52.07	1.9386	18 5 59.5	11.422	3	23 1 11.59	1.7687	7 56 14.1	13.683
4	21 34 48.23	1.9335	17 54 32.2	11.488	4	23 2 57.66	1.7669	7 42 32.3	13.712
5	21 36 44.09	1.9285	17 43 0.9	11.554	5	23 4 43.62	1.7652	7 28 48.7	13.740
6	21 38 39.65	1.9235	17 31 25.7	11.619	6	23 6 29.49	1.7637	7 15 3.5	13.768
7	21 40 34.91	1.9185	17 19 46.6	11.683	7	23 8 15.26	1.7622	7 1 16.6	13.795
8	21 42 29.87	1.9136	17 8 3.7	11.746	8	23 10 0.95	1.7607	6 47 28.1	13.821
9	21 44 24.54	1.9088	16 56 17.1	11.808	9	23 11 46.55	1.7593	6 33 38.1	13.847
10	21 46 18.93	1.9041	16 44 26.7	11.870	10	23 13 32.07	1.7581	6 19 46.5	13.872
11	21 48 13.03	1.8993	16 32 32.7	11.929	11	23 15 17.52	1.7569	6 5 53.5	13.896
12	21 50 6.85	1.8947	16 20 35.2	11.988	12	23 17 2.90	1.7558	5 51 59.0	13.920
13	21 52 0.39	1.8902	16 8 34.1	12.047	13	23 18 48.21	1.7547	5 38 3.1	13.943
14	21 53 53.67	1.8858	15 56 29.5	12.105	14	23 20 33.46	1.7537	5 24 5.9	13.965
15	21 55 46.68	1.8813	15 44 21.5	12.162	15	23 22 18.66	1.7528	5 10 7.3	13.987
16	21 57 39.42	1.8768	15 32 10.1	12.218	16	23 24 3.80	1.7520	4 56 7.5	14.008
17	21 59 31.90	1.8726	15 19 55.3	12.273	17	23 25 48.90	1.7513	4 42 6.4	14.028
18	22 1 24.13	1.8683	15 7 37.3	12.327	18	23 27 33.95	1.7506	4 28 4.1	14.048
19	22 3 16.10	1.8642	14 55 16.1	12.380	19	23 29 18.97	1.7500	4 14 0.6	14.067
20	22 5 7.83	1.8601	14 42 51.7	12.433	20	23 31 3.95	1.7494	3 59 56.0	14.086
21	22 6 59.31	1.8560	14 30 24.1	12.485	21	23 32 48.90	1.7490	3 45 50.3	14.103
22	22 8 50.55	1.8521	14 17 53.5	12.536	22	23 34 33.83	1.7487	3 31 43.6	14.120
23	22 10 41.56	1.8482	14 5 19.8	12.586	23	23 36 18.74	1.7484	3 17 35.9	14.137
24	22 12 32.33	1.8443	S.13 52 43.2	12.635	24	23 38 3.64	1.7482	S. 3 3 27.2	14.153

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THURSDAY 29.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	23 38 3.64	1.7482	S. 3 3 27.2	14.153
1	23 39 48.53	1.7482	2 49 17.6	14.168
2	23 41 33.42	1.7481	2 35 7.1	14.183
3	23 43 18.30	1.7481	2 20 55.7	14.197
4	23 45 3.19	1.7482	2 6 43.5	14.209
5	23 46 48.09	1.7484	1 52 30.6	14.222
6	23 48 33.00	1.7487	1 38 16.9	14.234
7	23 50 17.93	1.7491	1 24 2.5	14.245
8	23 52 2.89	1.7495	1 9 47.5	14.255
9	23 53 47.87	1.7500	0 55 31.9	14.265
10	23 55 32.89	1.7507	0 41 15.7	14.275
11	23 57 17.95	1.7513	0 26 58.9	14.283
12	23 59 3.05	1.7521	S. 0 12 41.7	14.291
13	0 0 48.20	1.7529	N. 0 1 36.0	14.298
14	0 2 33.40	1.7538	0 15 54.1	14.304
15	0 4 18.65	1.7548	0 30 12.5	14.310
16	0 6 3.97	1.7558	0 44 31.3	14.316
17	0 7 49.35	1.7570	0 58 50.4	14.320
18	0 9 34.81	1.7583	1 13 9.7	14.323
19	0 11 20.35	1.7596	1 27 29.2	14.327
20	0 13 5.96	1.7609	1 41 48.9	14.329
21	0 14 51.66	1.7625	1 56 8.7	14.330
22	0 16 37.46	1.7641	2 10 28.5	14.331
23	0 18 23.35	1.7657	N. 2 24 48.4	14.332

FRIDAY 30.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	0 20 9.34	1.7673	N. 2 39 8.3	14.331
1	0 21 55.43	1.7692	2 53 28.1	14.329
2	0 23 41.64	1.7711	3 7 47.8	14.327
3	0 25 27.96	1.7731	3 22 7.4	14.325
4	0 27 14.41	1.7752	3 36 26.8	14.322
5	0 29 0.98	1.7772	3 50 46.0	14.317
6	0 30 47.67	1.7794	4 5 4.9	14.312
7	0 32 34.51	1.7817	4 19 23.4	14.306
8	0 34 21.48	1.7841	4 33 41.6	14.300
9	0 36 8.60	1.7865	4 47 59.4	14.292
10	0 37 55.86	1.7890	5 2 16.7	14.284
11	0 39 43.28	1.7917	5 16 33.5	14.275
12	0 41 30.86	1.7943	5 30 49.7	14.265
13	0 43 18.60	1.7971	5 45 5.3	14.255
14	0 45 6.51	1.7999	5 59 20.3	14.243
15	0 46 54.59	1.8029	6 13 34.5	14.231
16	0 48 42.86	1.8059	6 27 48.0	14.218
17	0 50 31.30	1.8089	6 42 0.7	14.205
18	0 52 19.93	1.8122	6 56 12.6	14.190
19	0 54 8.76	1.8155	7 10 23.5	14.174
20	0 55 57.79	1.8187	7 24 33.5	14.158
21	0 57 47.01	1.8221	7 38 42.5	14.141
22	0 59 36.44	1.8257	7 52 50.4	14.122
23	1 1 26.09	1.8293	8 6 57.2	14.103
24	1 3 15.96	1.8330	N. 8 21 2.8	14.083

SATURDAY 31.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	1 3 15.96	1.8330	N. 8 21 2.8	14.083
1	1 5 6.05	1.8367	8 35 7.2	14.062
2	1 6 56.36	1.8405	8 49 10.3	14.041
3	1 8 46.91	1.8444	9 3 12.1	14.018
4	1 10 37.69	1.8484	9 17 12.5	13.995
5	1 12 28.72	1.8525	9 31 11.5	13.971
6	1 14 19.99	1.8566	9 45 9.0	13.945
7	1 16 11.51	1.8608	9 59 4.9	13.918
8	1 18 3.29	1.8652	10 12 59.2	13.891
9	1 19 55.33	1.8695	10 26 51.8	13.862
10	1 21 47.63	1.8740	10 40 42.7	13.833
11	1 23 40.21	1.8786	10 54 31.8	13.803
12	1 25 33.06	1.8832	11 8 19.0	13.771
13	1 27 26.19	1.8878	11 22 4.3	13.738
14	1 29 19.60	1.8927	11 35 47.6	13.705
15	1 31 13.31	1.8975	11 49 28.9	13.671
16	1 33 7.30	1.9023	12 3 8.1	13.635
17	1 35 1.59	1.9074	12 16 45.1	13.598
18	1 36 56.19	1.9125	12 30 19.8	13.560
19	1 38 51.09	1.9177	12 43 52.3	13.522
20	1 40 46.31	1.9229	12 57 22.4	13.481
21	1 42 41.84	1.9282	13 10 50.0	13.440
22	1 44 37.69	1.9336	13 24 15.2	13.398
23	1 46 33.87	1.9391	N. 13 37 37.8	13.354

SUNDAY, JUNE 1.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	1 48 30.38	1.9446	N. 13 50 57.7	13.309

PHASES OF THE MOON.

			d	h	m
●	New Moon . . .	May	5	20	24.3
☽	First Quarter		12	23	45.0
○	Full Moon		19	19	18.1
☾	Last Quarter		27	12	3.7

			d	h
☾	Perigee	May	15	13.6
☾	Apogee		27	19.9

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.		Added to Apparent Time.	
		h m s	s	° ′ ″	″	′ ″	s	m s	s
SUN.	1	4 34 58.59	10.229	N.22 0 52.7	+20.74	15 47.94	68.36	2 28.08	0.372
Mon.	2	4 39 4.30	10.246	22 8 59.1	19.78	15 47.80	68.41	2 18.95	0.389
Tues.	3	4 43 10.41	10.262	22 16 42.3	18.81	15 47.67	68.47	2 9.42	0.405
Wed.	4	4 47 16.90	10.277	22 24 2.2	+17.83	15 47.54	68.52	1 59.51	0.420
Thur.	5	4 51 23.75	10.292	22 30 58.6	16.85	15 47.41	68.57	1 49.25	0.435
Fri.	6	4 55 30.94	10.306	22 37 31.2	15.86	15 47.29	68.62	1 38.65	0.448
Sat.	7	4 59 38.44	10.318	22 43 40.0	+14.87	15 47.18	68.66	1 27.74	0.461
SUN.	8	5 3 46.22	10.330	22 49 24.9	13.87	15 47.07	68.70	1 16.54	0.472
Mon.	9	5 7 54.26	10.340	22 54 45.7	12.86	15 46.97	68.74	1 5.08	0.482
Tues.	10	5 12 2.55	10.350	22 59 42.3	+11.85	15 46.87	68.77	0 53.39	0.492
Wed.	11	5 16 11.06	10.359	23 4 14.5	10.83	15 46.78	68.80	0 41.48	0.500
Thur.	12	5 20 19.76	10.366	23 8 22.3	9.81	15 46.69	68.83	0 29.37	0.508
Fri.	13	5 24 28.63	10.372	23 12 5.7	+ 8.79	15 46.60	68.86	0 17.09	0.515
Sat.	14	5 28 37.65	10.378	23 15 24.6	7.77	15 46.52	68.88	0 4.66	0.521
SUN.	15	5 32 46.80	10.384	23 18 18.9	6.75	15 46.44	68.90	0 7.90	0.526
Mon.	16	5 36 56.07	10.388	23 20 48.5	+ 5.72	15 46.36	68.92	0 20.57	0.530
Tues.	17	5 41 5.43	10.391	23 22 53.4	4.69	15 46.29	68.93	0 33.33	0.533
Wed.	18	5 45 14.86	10.394	23 24 33.7	3.66	15 46.22	68.94	0 46.17	0.536
Thur.	19	5 49 24.35	10.396	23 25 49.3	+ 2.63	15 46.15	68.94	0 59.07	0.538
Fri.	20	5 53 33.88	10.397	23 26 40.1	1.60	15 46.09	68.94	1 12.00	0.539
Sat.	21	5 57 43.42	10.397	23 27 6.1	+ 0.57	15 46.04	68.94	1 24.94	0.539
SUN.	22	6 1 52.95	10.396	23 27 7.4	− 0.46	15 45.98	68.94	1 37.88	0.539
Mon.	23	6 6 2.46	10.395	23 26 43.9	1.50	15 45.93	68.94	1 50.80	0.537
Tues.	24	6 10 11.92	10.393	23 25 55.6	2.53	15 45.88	68.93	2 3.67	0.535
Wed.	25	6 14 21.31	10.389	23 24 42.5	− 3.56	15 45.83	68.92	2 16.47	0.531
Thur.	26	6 18 30.62	10.385	23 23 4.7	4.59	15 45.79	68.90	2 29.18	0.527
Fri.	27	6 22 39.82	10.380	23 21 2.2	5.61	15 45.76	68.88	2 41.78	0.522
Sat.	28	6 26 48.87	10.373	23 18 35.1	− 6.64	15 45.73	68.85	2 54.24	0.516
SUN.	29	6 30 57.76	10.366	23 15 43.5	7.67	15 45.70	68.82	3 6.54	0.509
Mon.	30	6 35 6.47	10.359	23 12 27.3	8.69	15 45.68	68.79	3 18.66	0.500
Tues.	31	6 39 14.97	10.350	N.23 8 46.6	− 9.71	15 45.66	68.76	3 30.57	0.491

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting $0^s.19$ from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign — indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Equation of Time to be Added to / Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ′ ″	″	m s	s	h m s
SUN.	1	4 34 59.01	10.228	N.22 0 53.6	+20.74	2 28.05	0.371	4 37 27.06
Mon.	2	4 39 4.69	10.245	22 8 59.9	19.78	2 18.93	0.389	4 41 23.62
Tues.	3	4 43 10.77	10.261	22 16 43.0	18.81	2 9.41	0.405	4 45 20.18
Wed.	4	4 47 17.24	10.276	22 24 2.8	+17.83	1 59.50	0.420	4 49 16.74
Thur.	5	4 51 24.06	10.291	22 30 59.0	16.85	1 49.24	0.435	4 53 13.30
Fri.	6	4 55 31.22	10.305	22 37 31.6	15.86	1 38.64	0.448	4 57 9.86
Sat.	7	4 59 38.69	10.317	22 43 40.4	+14.86	1 27.73	0.461	5 1 6.41
SUN.	8	5 3 46.44	10.328	22 49 25.2	13.86	1 16.53	0.472	5 5 2.97
Mon.	9	5 7 54.45	10.339	22 54 45.9	12.86	1 5.07	0.482	5 8 59.53
Tues.	10	5 12 2.71	10.348	22 59 42.4	+11.85	0 53.38	0.492	5 12 56.09
Wed.	11	5 16 11.18	10.357	23 4 14.6	10.84	0 41.47	0.500	5 16 52.65
Thur.	12	5 20 19.84	10.364	23 8 22.4	9.82	0 29.37	0.508	5 20 49.21
Fri.	13	5 24 28.68	10.371	23 12 5.8	+ 8.80	0 17.09	0.515	5 24 45.76
Sat.	14	5 28 37.66	10.377	23 15 24.6	7.78	0 4.66	0.521	5 28 42.32
SUN.	15	5 32 46.78	10.383	23 18 18.9	6.75	0 7.90	0.526	5 32 38.88
Mon.	16	5 36 56.01	10.387	23 20 48.5	+ 5.72	0 20.57	0.530	5 36 35.44
Tues.	17	5 41 5.33	10.390	23 22 53.5	4.69	0 33.33	0.533	5 40 32.00
Wed.	18	5 45 14.73	10.393	23 24 33.8	3.66	0 46.17	0.536	5 44 28.56
Thur.	19	5 49 24.18	10.395	23 25 49.3	+ 2.63	0 59.06	0.538	5 48 25.12
Fri.	20	5 53 33.66	10.396	23 26 40.1	1.60	1 11.99	0.539	5 52 21.68
Sat.	21	5 57 43.17	10.396	23 27 6.1	+ 0.57	1 24.93	0.539	5 56 18.24
SUN.	22	6 1 52.67	10.395	23 27 7.4	− 0.46	1 37.87	0.539	6 0 14.79
Mon.	23	6 6 2.14	10.393	23 26 43.9	1.50	1 50.78	0.537	6 4 11.35
Tues.	24	6 10 11.56	10.391	23 25 55.6	2.53	2 3.65	0.535	6 8 7.91
Wed.	25	6 14 20.92	10.388	23 24 42.6	− 3.56	2 16.45	0.531	6 12 4.47
Thur.	26	6 18 30.19	10.384	23 23 4.9	4.59	2 29.16	0.527	6 16 1.03
Fri.	27	6 22 39.34	10.379	23 21 2.5	5.61	2 41.76	0.522	6 19 57.59
Sat.	28	6 26 48.36	10.372	23 18 35.5	− 6.64	2 54.22	0.516	6 23 54.14
SUN.	29	6 30 57.22	10.365	23 15 43.9	7.66	3 6.52	0.509	6 27 50.70
Mon.	30	6 35 5.89	10.357	23 12 27.8	8.68	3 18.63	0.500	6 31 47.26
Tues.	31	6 39 14.36	10.348	N.23 8 47.2	− 9.70	3 30.53	0.491	6 35 43.82

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign − indicates that north declinations are decreasing.

Diff. for 1 Hour.
+9ˢ.8565.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S True Longitude. λ	THE SUN'S True Longitude. λ'	THE SUN'S Diff. for 1 Hour.	THE SUN'S Latitude.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		° ′ ″	′ ″	″	″			h m s
1	152	70 22 3.9	21 43.7	143.74	+0.14	0.006 1677	+27.1	19 19 22.48
2	153	71 19 33.3	19 12.9	143.70	0.24	0.006 2317	26.2	19 15 26.57
3	154	72 17 1.8	16 41.2	143.67	0.32	0.006 2934	25.2	19 11 30.66
4	155	73 14 29.4	14 8.7	143.63	+0.37	0.006 3527	+24.2	19 7 34.74
5	156	74 11 56.1	11 35.2	143.59	0.39	0.006 4096	23.2	19 3 38.83
6	157	75 9 21.9	9 0.8	143.55	0.39	0.006 4640	22.2	18 59 42.92
7	158	76 6 46.8	6 25.5	143.51	+0.35	0.006 5160	+21.2	18 55 47.01
8	159	77 4 10.7	3 49.2	143.47	0.28	0.006 5656	20.2	18 51 51.09
9	160	78 1 33.5	1 11.8	143.43	0.18	0.006 6128	19.3	18 47 55.18
10	161	78 58 55.2	58 33.3	143.39	+0.06	0.006 6580	+18.4	18 43 59.27
11	162	79 56 15.9	55 53.8	143.34	−0.06	0.006 7010	17.6	18 40 3.36
12	163	80 53 35.6	53 13.4	143.30	0.18	0.006 7421	16.8	18 36 7.44
13	164	81 50 54.3	50 31.9	143.26	−0.32	0.006 7813	+16.1	18 32 11.53
14	165	82 48 12.1	47 49.5	143.22	0.45	0.006 8189	15.4	18 28 15.62
15	166	83 45 29.0	45 6.2	143.19	0.56	0.006 8549	14.7	18 24 19.71
16	167	84 42 45.2	42 22.1	143.16	−0.64	0.006 8894	+14.1	18 20 23.79
17	168	85 40 0.6	39 37.4	143.13	0.70	0.006 9225	13.5	18 16 27.88
18	169	86 37 15.4	36 52.0	143.11	0.74	0.006 9543	12.9	18 12 31.97
19	170	87 34 29.7	34 6.1	143.09	−0.74	0.006 9847	+12.3	18 8 36.05
20	171	88 31 43.6	31 19.8	143.08	0.71	0.007 0136	11.7	18 4 40.14
21	172	89 28 57.2	28 33.2	143.07	0.66	0.007 0410	11.1	18 0 44.23
22	173	90 26 10.5	25 46.3	143.06	−0.60	0.007 0669	+10.5	17 56 48.31
23	174	91 23 23.7	22 59.3	143.05	0.51	0.007 0912	9.8	17 52 52.40
24	175	92 20 36.7	20 12.1	143.04	0.41	0.007 1138	9.0	17 48 56.49
25	176	93 17 49.6	17 24.8	143.04	−0.29	0.007 1345	+ 8.2	17 45 0.58
26	177	94 15 2.5	14 37.6	143.04	0.17	0.007 1534	7.4	17 41 4.66
27	178	95 12 15.5	11 50.3	143.04	−0.05	0.007 1703	6.6	17 37 8.75
28	179	96 9 28.5	9 3.1	143.04	+0.06	0.007 1850	+ 5.7	17 33 12.84
29	180	97 6 41.5	6 16.0	143.05	0.17	0.007 1976	4.7	17 29 16.93
30	181	98 3 54.7	3 29.0	143.05	0.25	0.007 2079	3.7	17 25 21.01
31	182	99 1 8.0	0 42.0	143.05	+0.29	0.007 2157	+ 2.7	17 21 25.10

Note.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ′ are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour, $-9^{s}.8296$. (Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 10.7	15 15.6	55 36.44	+1.455	55 54.44	+1.542	21 51.4	1.98	26.1
2	15 20.7	15 26.1	56 13.34	1.602	56 32.77	1.631	22 41.3	2.18	27.1
3	15 31.4	15 36.7	56 52.36	1.630	57 11.78	1.602	23 36.1	2.38	28.1
4	15 41.8	15 46.8	57 30.69	+1.546	57 48.76	+1.462	☌	. .	29.1
5	15 51.4	15 55.6	58 5.70	1.357	58 21.26	1.231	0 35.1	2.52	0.7
6	15 59.4	16 2.7	58 35.21	1.091	58 47.41	0.941	1 36.5	2.57	1.7
7	16 5.6	16 7.9	58 57.76	+0.785	59 6.24	+0.628	2 37.7	2.50	2.7
8	16 9.7	16 11.0	59 12.85	0.473	59 17.63	0.325	3 36.2	2.36	3.7
9	16 11.8	16 12.2	59 20.68	+0.185	59 22.09	+0.052	4 30.8	2.20	4.7
10	16 12.2	16 11.7	59 21.96	−0.071	59 20.40	−0.185	5 21.9	2.06	5.7
11	16 10.9	16 9.8	59 17.54	0.289	59 13.47	0.388	6 10.3	1.98	6.7
12	16 8.4	16 6.7	59 8.24	0.482	59 1.89	0.574	6 57.6	1.97	7.7
13	16 4.7	16 2.4	58 54.47	−0.662	58 45.99	−0.750	7 45.1	2.00	8.7
14	15 59.8	15 56.9	58 36.46	0.838	58 25.88	0.925	8 34.2	2.10	9.7
15	15 53.7	15 50.3	58 14.27	1.009	58 1.65	1.093	9 25.9	2.21	10.7
16	15 46.6	15 42.6	57 48.06	−1.171	57 33.57	−1.243	10 20.4	2.33	11.7
17	15 38.5	15 34.1	57 18.30	1.301	57 2.39	1.348	11 17.3	2.40	12.7
18	15 29.7	15 25.1	56 45.99	1.382	56 29.29	1.397	12 14.9	2.38	13.7
19	15 20.5	15 16.0	56 12.52	−1.393	55 55.94	−1.368	13 11.1	2.29	14.7
20	15 11.6	15 7.4	55 39.78	1.322	55 24.30	1.255	14 4.2	2.13	15.7
21	15 3.4	14 59.8	55 9.76	1.164	54 56.43	1.054	14 53.4	1.96	16.7
22	14 56.5	14 53.8	54 44.53	−0.925	54 34.29	−0.779	15 38.6	1.81	17.7
23	14 51.5	14 49.8	54 25.91	0.616	54 19.60	0.434	16 20.7	1.70	18.7
24	14 48.6	14 48.2	54 15.54	−0.242	54 13.83	−0.043	17 0.6	1.64	19.7
25	14 48.4	14 49.3	54 14.54	+0.162	54 17.76	+0.375	17 39.6	1.62	20.7
26	14 50.8	14 53.1	54 23.55	0.589	54 31.91	0.803	18 18.7	1.65	21.7
27	14 56.1	14 59.7	54 42.79	1.010	54 56.09	1.206	18 59.4	1.74	22.7
28	15 4.0	15 8.8	55 11.68	+1.390	55 29.39	+1.558	19 42.8	1.88	23.7
29	15 14.1	15 19.9	55 49.00	1.706	56 10.23	1.827	20 30.2	2.08	24.7
30	15 26.0	15 32.4	56 32.72	1.917	56 56.11	1.976	21 22.6	2.29	25.7
31	15 38.9	15 45.4	57 19.98	1.997	57 43.87	1.978	22 20.0	2.48	26.7
32	15 51.8	15 57.9	58 7.26	+1.913	58 29.64	+1.809	23 21.4	2.60	27.7

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 1.					TUESDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	1 48 30.38	1.9446	N.13 50 57.7	13.309	0	3 29 25.38	2.2782	N.23 13 43.3	9.585
1	1 50 27.22	1.9502	14 4 14.9	13.264	1	3 31 42.31	2.2860	23 23 15.0	9.470
2	1 52 24.40	1.9558	14 17 29.4	13.217	2	3 33 59.70	2.2937	23 32 39.7	9.353
3	1 54 21.92	1.9617	14 30 41.0	13.169	3	3 36 17.56	2.3015	23 41 57.4	9.236
4	1 56 19.80	1.9675	14 43 49.7	13.120	4	3 38 35.88	2.3092	23 51 8.0	9.116
5	1 58 18.02	1.9733	14 56 55.4	13.069	5	3 40 54.66	2.3168	24 0 11.3	8.994
6	2 0 16.60	1.9793	15 9 58.0	13.017	6	3 43 13.90	2.3245	24 9 7.3	8.872
7	2 2 15.54	1.9853	15 22 57.5	12.965	7	3 45 33.60	2.3322	24 17 55.9	8.747
8	2 4 14.84	1.9915	15 35 53.8	12.910	8	3 47 53.76	2.3398	24 26 36.9	8.621
9	2 6 14.52	1.9977	15 48 46.7	12.854	9	3 50 14.38	2.3474	24 35 10.4	8.493
10	2 8 14.57	2.0039	16 1 36.3	12.798	10	3 52 35.45	2.3549	24 43 36.1	8.363
11	2 10 14.99	2.0102	16 14 22.5	12.741	11	3 54 56.97	2.3625	24 51 54.0	8.232
12	2 12 15.80	2.0167	16 27 5.2	12.682	12	3 57 18.95	2.3700	25 0 4.0	8.100
13	2 14 16.99	2.0230	16 39 44.3	12.621	13	3 59 41.37	2.3775	25 8 6.0	7.966
14	2 16 18.56	2.0295	16 52 19.7	12.558	14	4 2 4.25	2.3850	25 15 59.9	7.830
15	2 18 20.53	2.0361	17 4 51.3	12.495	15	4 4 27.57	2.3923	25 23 45.6	7.692
16	2 20 22.89	2.0427	17 17 19.1	12.430	16	4 6 51.33	2.3997	25 31 23.0	7.553
17	2 22 25.66	2.0495	17 29 42.9	12.364	17	4 9 15.53	2.4069	25 38 52.0	7.412
18	2 24 28.83	2.0562	17 42 2.8	12.297	18	4 11 40.16	2.4142	25 46 12.5	7.270
19	2 26 32.40	2.0629	17 54 18.5	12.227	19	4 14 5.23	2.4213	25 53 24.4	7.126
20	2 28 36.38	2.0698	18 6 30.1	12.157	20	4 16 30.72	2.4284	26 0 27.6	6.981
21	2 30 40.78	2.0767	18 18 37.4	12.086	21	4 18 56.64	2.4355	26 7 22.1	6.834
22	2 32 45.59	2.0837	18 30 40.4	12.013	22	4 21 22.98	2.4424	26 14 7.7	6.686
23	2 34 50.82	2.0907	N.18 42 39.0	11.939	23	4 23 49.73	2.4492	N.26 20 44.4	6.537
	MONDAY 2.					WEDNESDAY 4.			
0	2 36 56.48	2.0978	N.18 54 33.1	11.863	0	4 26 16.89	2.4561	N.26 27 12.1	6.386
1	2 39 2.56	2.1049	19 6 22.6	11.786	1	4 28 44.46	2.4628	26 33 30.7	6.232
2	2 41 9.07	2.1121	19 18 7.4	11.707	2	4 31 12.43	2.4695	26 39 40.0	6.077
3	2 43 16.01	2.1193	19 29 47.4	11.626	3	4 33 40.80	2.4761	26 45 40.0	5.922
4	2 45 23.39	2.1266	19 41 22.5	11.544	4	4 36 9.56	2.4826	26 51 30.6	5.765
5	2 47 31.20	2.1339	19 52 52.7	11.462	5	4 38 38.71	2.4889	26 57 11.8	5.607
6	2 49 39.46	2.1413	20 4 17.9	11.378	6	4 41 8.23	2.4952	27 2 43.4	5.446
7	2 51 48.16	2.1487	20 15 37.9	11.290	7	4 43 38.13	2.5013	27 8 5.3	5.285
8	2 53 57.30	2.1560	20 26 52.7	11.202	8	4 46 8.39	2.5073	27 13 17.6	5.122
9	2 56 6.88	2.1635	20 38 2.2	11.113	9	4 48 39.01	2.5132	27 18 20.0	4.958
10	2 58 16.92	2.1710	20 49 6.3	11.022	10	4 51 9.99	2.5192	27 23 12.6	4.793
11	3 0 27.40	2.1785	21 0 4.9	10.930	11	4 53 41.31	2.5249	27 27 55.2	4.626
12	3 2 38.34	2.1861	21 10 57.9	10.836	12	4 56 12.97	2.5305	27 32 27.7	4.457
13	3 4 49.73	2.1937	21 21 45.2	10.740	13	4 58 44.97	2.5360	27 36 50.1	4.289
14	3 7 1.58	2.2012	21 32 26.7	10.643	14	5 1 17.29	2.5413	27 41 2.4	4.119
15	3 9 13.88	2.2088	21 43 2.4	10.545	15	5 3 49.93	2.5466	27 45 4.4	3.947
16	3 11 26.64	2.2166	21 53 32.1	10.444	16	5 6 22.88	2.5517	27 48 56.0	3.774
17	3 13 39.87	2.2242	22 3 55.7	10.342	17	5 8 56.13	2.5566	27 52 37.3	3.601
18	3 15 53.55	2.2319	22 14 13.2	10.239	18	5 11 29.67	2.5614	27 56 8.1	3.426
19	3 18 7.70	2.2397	22 24 24.4	10.134	19	5 14 3.50	2.5662	27 59 28.4	3.250
20	3 20 22.31	2.2473	22 34 29.3	10.027	20	5 16 37.61	2.5707	28 2 38.1	3.073
21	3 22 37.38	2.2551	22 44 27.7	9.919	21	5 19 11.99	2.5751	28 5 37.2	2.896
22	3 24 52.92	2.2628	22 54 19.6	9.809	22	5 21 46.62	2.5793	28 8 25.6	2.717
23	3 27 8.92	2.2705	23 4 4.8	9.697	23	5 24 21.50	2.5834	28 11 3.2	2.537
24	3 29 25.38	2.2782	N.23 13 43.3	9.585	24	5 26 56.63	2.5874	N.28 13 30.0	2.356

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THURSDAY 5.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	5 26 56.63	2.5874	N.28 13 30.0	2.356
1	5 29 31.99	2.5912	28 15 45.9	2.174
2	5 32 7.57	2.5947	28 17 50.9	1.992
3	5 34 43.36	2.5982	28 19 44.9	1.808
4	5 37 19.35	2.6015	28 21 27.8	1.623
5	5 39 55.54	2.6047	28 22 59.7	1.439
6	5 42 31.91	2.6077	28 24 20.5	1.254
7	5 45 8.46	2.6105	28 25 30.2	1.068
8	5 47 45.17	2.6131	28 26 28.7	0.882
9	5 50 22.03	2.6155	28 27 16.0	0.694
10	5 52 59.03	2.6178	28 27 52.0	0.507
11	5 55 36.17	2.6200	28 28 16.8	0.318
12	5 58 13.43	2.6219	28 28 30.2	+0.129
13	6 0 50.80	2.6237	28 28 32.3	−0.060
14	6 3 28.27	2.6253	28 28 23.0	0.250
15	6 6 5.83	2.6267	28 28 2.3	0.439
16	6 8 43.47	2.6279	28 27 30.3	0.629
17	6 11 21.18	2.6290	28 26 46.8	0.820
18	6 13 58.95	2.6298	28 25 51.9	1.010
19	6 16 36.76	2.6305	28 24 45.6	1.201
20	6 19 14.61	2.6311	28 23 27.9	1.391
21	6 21 52.49	2.6314	28 21 58.7	1.582
22	6 24 30.38	2.6316	28 20 18.0	1.773
23	6 27 8.28	2.6316	N.28 18 25.9	1.963

FRIDAY 6.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	6 29 46.17	2.6314	N.28 16 22.4	2.154
1	6 32 24.05	2.6311	28 14 7.4	2.345
2	6 35 1.90	2.6305	28 11 41.0	2.535
3	6 37 39.71	2.6298	28 9 3.2	2.726
4	6 40 17.47	2.6289	28 6 13.9	2.916
5	6 42 55.18	2.6279	28 3 13.3	3.105
6	6 45 32.82	2.6267	28 0 1.3	3.295
7	6 48 10.38	2.6253	27 56 37.9	3.484
8	6 50 47.85	2.6237	27 53 3.2	3.672
9	6 53 25.22	2.6220	27 49 17.2	3.861
10	6 56 2.49	2.6202	27 45 19.9	4.048
11	6 58 39.64	2.6181	27 41 11.4	4.236
12	7 1 16.66	2.6158	27 36 51.6	4.422
13	7 3 53.54	2.6135	27 32 20.7	4.608
14	7 6 30.28	2.6110	27 27 38.6	4.794
15	7 9 6.86	2.6082	27 22 45.4	4.979
16	7 11 43.27	2.6054	27 17 41.1	5.163
17	7 14 19.51	2.6025	27 12 25.8	5.347
18	7 16 55.57	2.5994	27 6 59.5	5.529
19	7 19 31.44	2.5962	27 1 22.3	5.711
20	7 22 7.11	2.5928	26 55 34.2	5.892
21	7 24 42.57	2.5892	26 49 35.3	6.072
22	7 27 17.82	2.5856	26 43 25.6	6.251
23	7 29 52.84	2.5818	26 37 5.2	6.428
24	7 32 27.64	2.5779	N.26 30 34.2	6.605

SATURDAY 7.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	7 32 27.64	2.5779	N.26 30 34.2	6.605
1	7 35 2.19	2.5738	26 23 52.6	6.782
2	7 37 36.50	2.5697	26 17 0.4	6.957
3	7 40 10.55	2.5654	26 9 57.8	7.130
4	7 42 44.35	2.5611	26 2 44.8	7.303
5	7 45 17.88	2.5565	25 55 21.4	7.475
6	7 47 51.13	2.5519	25 47 47.8	7.645
7	7 50 24.11	2.5473	25 40 4.0	7.815
8	7 52 56.81	2.5425	25 32 10.0	7.983
9	7 55 29.21	2.5375	25 24 6.0	8.150
10	7 58 1.31	2.5326	25 15 52.0	8.315
11	8 0 33.12	2.5276	25 7 28.2	8.479
12	8 3 4.62	2.5223	24 58 54.5	8.642
13	8 5 35.80	2.5171	24 50 11.1	8.804
14	8 8 6.67	2.5118	24 41 18.0	8.964
15	8 10 37.22	2.5064	24 32 15.4	9.122
16	8 13 7.44	2.5009	24 23 3.3	9.279
17	8 15 37.33	2.4955	24 13 41.9	9.435
18	8 18 6.90	2.4899	24 4 11.1	9.590
19	8 20 36.12	2.4842	23 54 31.1	9.743
20	8 23 5.00	2.4785	23 44 41.9	9.895
21	8 25 33.54	2.4727	23 34 43.7	10.044
22	8 28 1.73	2.4670	23 24 36.6	10.192
23	8 30 29.58	2.4612	N.23 14 20.6	10.340

SUNDAY 8.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	8 32 57.07	2.4552	N.23 3 55.8	10.485
1	8 35 24.21	2.4493	22 53 22.4	10.628
2	8 37 50.99	2.4433	22 42 40.4	10.771
3	8 40 17.41	2.4373	22 31 49.9	10.912
4	8 42 43.47	2.4313	22 20 51.0	11.051
5	8 45 9.17	2.4253	22 9 43.8	11.187
6	8 47 34.51	2.4192	21 58 28.5	11.323
7	8 49 59.48	2.4132	21 47 5.0	11.458
8	8 52 24.09	2.4071	21 35 33.5	11.591
9	8 54 48.33	2.4010	21 23 54.1	11.721
10	8 57 12.21	2.3949	21 12 7.0	11.850
11	8 59 35.72	2.3888	21 0 12.1	11.978
12	9 1 58.87	2.3828	20 48 9.6	12.103
13	9 4 21.65	2.3766	20 35 59.7	12.227
14	9 6 44.06	2.3705	20 23 42.3	12.350
15	9 9 6.11	2.3644	20 11 17.7	12.471
16	9 11 27.79	2.3583	19 58 45.8	12.591
17	9 13 49.11	2.3523	19 46 6.8	12.708
18	9 16 10.06	2.3462	19 33 20.8	12.823
19	9 18 30.65	2.3402	19 20 28.0	12.937
20	9 20 50.88	2.3342	19 7 28.4	13.049
21	9 23 10.75	2.3282	18 54 22.1	13.160
22	9 25 30.26	2.3222	18 41 9.2	13.269
23	9 27 49.42	2.3163	18 27 49.8	13.377
24	9 30 8.22	2.3104	N.18 14 24.0	13.482

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 9.					WEDNESDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	9 30 8.22	2.3104	N. 18 14 24.0	13.482	0	11 15 18.12	2.0993	N. 5 57 33.3	16.598
1	9 32 26.67	2.3046	18 0 52.0	13.585	1	11 17 24.01	2.0969	5 40 56.6	16.624
2	9 34 44.77	2.2988	17 47 13.8	13.687	2	11 19 29.75	2.0946	5 24 18.4	16.648
3	9 37 2.52	2.2929	17 33 29.5	13.788	3	11 21 35.36	2.0924	5 7 38.8	16.672
4	9 39 19.92	2.2872	17 19 39.2	13.887	4	11 23 40.84	2.0902	4 50 57.8	16.693
5	9 41 36.99	2.2816	17 5 43.1	13.983	5	11 25 46.19	2.0882	4 34 15.6	16.713
6	9 43 53.71	2.2758	16 51 41.2	14.078	6	11 27 51.42	2.0862	4 17 32.2	16.732
7	9 46 10.09	2.2702	16 37 33.7	14.172	7	11 29 56.53	2.0843	4 0 47.7	16.750
8	9 48 26.14	2.2647	16 23 20.6	14.264	8	11 32 1.54	2.0826	3 44 2.2	16.766
9	9 50 41.85	2.2592	16 9 2.0	14.355	9	11 34 6.44	2.0808	3 27 15.8	16.781
10	9 52 57.24	2.2537	15 54 38.0	14.443	10	11 36 11.24	2.0792	3 10 28.5	16.794
11	9 55 12.30	2.2483	15 40 8.8	14.530	11	11 38 15.95	2.0777	2 53 40.5	16.805
12	9 57 27.04	2.2430	15 25 34.4	14.615	12	11 40 20.57	2.0763	2 36 51.9	16.815
13	9 59 41.46	2.2377	15 10 55.0	14.698	13	11 42 25.11	2.0750	2 20 2.7	16.823
14	10 1 55.57	2.2325	14 56 10.6	14.780	14	11 44 29.57	2.0738	2 3 13.1	16.830
15	10 4 9.36	2.2273	14 41 21.4	14.860	15	11 46 33.96	2.0727	1 46 23.1	16.837
16	10 6 22.85	2.2222	14 26 27.4	14.939	16	11 48 38.29	2.0717	1 29 32.7	16.841
17	10 8 36.03	2.2172	14 11 28.7	15.016	17	11 50 42.56	2.0707	1 12 42.2	16.843
18	10 10 48.91	2.2122	13 56 25.5	15.091	18	11 52 46.78	2.0699	0 55 51.5	16.845
19	10 13 1.50	2.2073	13 41 17.8	15.164	19	11 54 50.95	2.0691	0 39 0.8	16.844
20	10 15 13.79	2.2024	13 26 5.8	15.236	20	11 56 55.07	2.0684	0 22 10.2	16.843
21	10 17 25.79	2.1977	13 10 49.5	15.306	21	11 58 59.16	2.0679	N. 0 5 19.7	16.841
22	10 19 37.51	2.1930	12 55 29.1	15.374	22	12 1 3.22	2.0674	S. 0 11 30.7	16.837
23	10 21 48.95	2.1884	N. 12 40 4.6	15.442	23	12 3 7.25	2.0670	S. 0 28 20.7	16.830
	TUESDAY 10.					THURSDAY 12.			
0	10 24 0.12	2.1839	N. 12 24 36.1	15.507	0	12 5 11.26	2.0667	S. 0 45 10.3	16.822
1	10 26 11.02	2.1794	12 9 3.8	15.570	1	12 7 15.26	2.0666	1 1 59.4	16.814
2	10 28 21.65	2.1750	11 53 27.7	15.632	2	12 9 19.25	2.0664	1 18 48.0	16.805
3	10 30 32.02	2.1707	11 37 47.9	15.692	3	12 11 23.23	2.0664	1 35 36.0	16.793
4	10 32 42.13	2.1664	11 22 4.6	15.751	4	12 13 27.22	2.0665	1 52 23.2	16.780
5	10 34 51.99	2.1623	11 6 17.8	15.808	5	12 15 31.21	2.0667	2 9 9.6	16.766
6	10 37 1.61	2.1582	10 50 27.6	15.864	6	12 17 35.22	2.0670	2 25 55.1	16.750
7	10 39 10.98	2.1542	10 34 34.1	15.917	7	12 19 39.25	2.0673	2 42 39.6	16.733
8	10 41 20.11	2.1502	10 18 37.5	15.970	8	12 21 43.30	2.0677	2 59 23.1	16.715
9	10 43 29.01	2.1465	10 2 37.7	16.022	9	12 23 47.38	2.0682	3 16 5.4	16.694
10	10 45 37.69	2.1427	9 46 34.9	16.070	10	12 25 51.49	2.0689	3 32 46.4	16.673
11	10 47 46.14	2.1390	9 30 29.3	16.117	11	12 27 55.65	2.0697	3 49 26.2	16.651
12	10 49 54.37	2.1354	9 14 20.8	16.164	12	12 29 59.85	2.0704	4 6 4.5	16.626
13	10 52 2.39	2.1319	8 58 9.6	16.208	13	12 32 4.10	2.0713	4 22 41.3	16.601
14	10 54 10.20	2.1286	8 41 55.8	16.252	14	12 34 8.41	2.0723	4 39 16.6	16.574
15	10 56 17.81	2.1252	8 25 39.4	16.293	15	12 36 12.78	2.0734	4 55 50.2	16.546
16	10 58 25.23	2.1220	8 9 20.6	16.332	16	12 38 17.22	2.0746	5 12 22.1	16.516
17	11 0 32.46	2.1189	7 52 59.5	16.371	17	12 40 21.73	2.0758	5 28 52.1	16.484
18	11 2 39.50	2.1158	7 36 36.1	16.408	18	12 42 26.32	2.0772	5 45 20.2	16.452
19	11 4 46.36	2.1128	7 20 10.5	16.444	19	12 44 30.99	2.0786	6 1 46.3	16.417
20	11 6 53.04	2.1099	7 3 42.8	16.477	20	12 46 35.75	2.0801	6 18 10.3	16.382
21	11 8 59.55	2.1072	6 47 13.2	16.509	21	12 48 40.60	2.0817	6 34 32.2	16.346
22	11 11 5.90	2.1045	6 30 41.7	16.540	22	12 50 45.55	2.0834	6 50 51.8	16.307
23	11 13 12.09	2.1018	6 14 8.4	16.570	23	12 52 50.61	2.0852	7 7 9.1	16.268
24	11 15 18.12	2.0993	N. 5 57 33.3	16.598	24	12 54 55.77	2.0869	S. 7 23 24.0	16.227

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 13.					SUNDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	12 54 55.77	2.0869	S. 7 23 24.0	16.227	0	14 38 36.43	2.2551	S. 19 8 4.4	12.588
1	12 57 1.04	2.0889	7 39 36.4	16.184	1	14 40 51.87	2.2597	19 20 36.4	12.477
2	12 59 6.44	2.0910	7 55 46.1	16.140	2	14 43 7.59	2.2643	19 33 1.7	12.366
3	13 1 11.96	2.0930	8 11 53.2	16.096	3	14 45 23.59	2.2690	19 45 20.3	12.252
4	13 3 17.60	2.0952	8 27 57.6	16.049	4	14 47 39.87	2.2736	19 57 32.1	12.138
5	13 5 23.38	2.0975	8 43 59.1	16.001	5	14 49 56.43	2.2782	20 9 36.9	12.022
6	13 7 29.30	2.0998	8 59 57.7	15.952	6	14 52 13.26	2.2829	20 21 34.7	11.905
7	13 9 35.36	2.1022	9 15 53.3	15.901	7	14 54 30.37	2.2875	20 33 25.5	11.787
8	13 11 41.56	2.1047	9 31 45.8	15.848	8	14 56 47.76	2.2922	20 45 9.1	11.666
9	13 13 47.92	2.1072	9 47 35.1	15.794	9	14 59 5.44	2.2969	20 56 45.5	11.545
10	13 15 54.43	2.1099	10 3 21.1	15.739	10	15 1 23.39	2.3015	21 8 14.5	11.422
11	13 18 1.11	2.1127	10 19 3.8	15.682	11	15 3 41.62	2.3062	21 19 36.1	11.298
12	13 20 7.95	2.1154	10 34 43.0	15.624	12	15 6 0.13	2.3108	21 30 50.3	11.173
13	13 22 14.96	2.1182	10 50 18.7	15.565	13	15 8 18.92	2.3155	21 41 56.9	11.047
14	13 24 22.14	2.1212	11 5 50.8	15.504	14	15 10 37.99	2.3201	21 52 55.9	10.919
15	13 26 29.50	2.1242	11 21 19.2	15.442	15	15 12 57.33	2.3247	22 3 47.2	10.790
16	13 28 37.05	2.1273	11 36 43.8	15.378	16	15 15 16.95	2.3292	22 14 30.7	10.660
17	13 30 44.78	2.1304	11 52 4.6	15.313	17	15 17 36.84	2.3337	22 25 6.4	10.528
18	13 32 52.70	2.1337	12 7 21.4	15.247	18	15 19 57.00	2.3383	22 35 34.1	10.395
19	13 35 0.82	2.1370	12 22 34.2	15.178	19	15 22 17.43	2.3428	22 45 53.8	10.262
20	13 37 9.14	2.1403	12 37 42.8	15.109	20	15 24 38.14	2.3473	22 56 5.5	10.127
21	13 39 17.66	2.1437	12 52 47.2	15.038	21	15 26 59.12	2.3518	23 6 9.0	9.990
22	13 41 26.38	2.1472	13 7 47.4	14.966	22	15 29 20.36	2.3562	23 16 4.3	9.852
23	13 43 35.32	2.1507	S. 13 22 43.2	14.892	23	15 31 41.86	2.3605	S. 23 25 51.3	9.713
	SATURDAY 14.					MONDAY 16.			
0	13 45 44.47	2.1543	S. 13 37 34.5	14.817	0	15 34 3.62	2.3648	S. 23 35 29.9	9.573
1	13 47 53.84	2.1580	13 52 21.3	14.741	1	15 36 25.64	2.3692	23 45 0.1	9.432
2	13 50 3.43	2.1617	14 7 3.4	14.662	2	15 38 47.92	2.3734	23 54 21.8	9.290
3	13 52 13.24	2.1654	14 21 40.8	14.583	3	15 41 10.45	2.3775	24 3 34.9	9.147
4	13 54 23.28	2.1693	14 36 13.4	14.502	4	15 43 33.22	2.3817	24 12 39.4	9.003
5	13 56 33.56	2.1732	14 50 41.1	14.420	5	15 45 56.25	2.3858	24 21 35.3	8.857
6	13 58 44.07	2.1772	15 5 3.8	14.337	6	15 48 19.52	2.3898	24 30 22.4	8.710
7	14 0 54.82	2.1812	15 19 21.5	14.252	7	15 50 43.03	2.3937	24 39 0.6	8.563
8	14 3 5.81	2.1852	15 33 34.0	14.165	8	15 53 6.77	2.3977	24 47 29.9	8.415
9	14 5 17.04	2.1892	15 47 41.3	14.077	9	15 55 30.75	2.4015	24 55 50.3	8.265
10	14 7 28.52	2.1933	16 1 43.2	13.987	10	15 57 54.95	2.4053	25 4 1.7	8.114
11	14 9 40.24	2.1975	16 15 39.7	13.897	11	16 0 19.38	2.4090	25 12 4.0	7.963
12	14 11 52.22	2.2017	16 29 30.8	13.805	12	16 2 44.03	2.4126	25 19 57.3	7.811
13	14 14 4.45	2.2060	16 43 16.3	13.711	13	16 5 8.89	2.4162	25 27 41.3	7.657
14	14 16 16.94	2.2103	16 56 56.1	13.616	14	16 7 33.97	2.4197	25 35 16.1	7.502
15	14 18 29.69	2.2147	17 10 30.2	13.519	15	16 9 59.25	2.4230	25 42 41.6	7.347
16	14 20 42.70	2.2191	17 23 58.4	13.421	16	16 12 24.73	2.4263	25 49 57.8	7.192
17	14 22 55.98	2.2235	17 37 20.7	13.322	17	16 14 50.41	2.4296	25 57 4.6	7.034
18	14 25 9.52	2.2279	17 50 37.0	13.222	18	16 17 16.28	2.4327	26 4 1.9	6.877
19	14 27 23.33	2.2323	18 3 47.3	13.119	19	16 19 42.33	2.4357	26 10 49.8	6.719
20	14 29 37.40	2.2368	18 16 51.4	13.016	20	16 22 8.56	2.4386	26 17 28.2	6.559
21	14 31 51.75	2.2414	18 29 49.2	12.911	21	16 24 34.96	2.4414	26 23 56.9	6.399
22	14 34 6.37	2.2459	18 42 40.7	12.805	22	16 27 1.53	2.4442	26 30 16.1	6.239
23	14 36 21.26	2.2505	18 55 25.8	12.697	23	16 29 28.26	2.4468	26 36 25.6	6.077
24	14 38 36.43	2.2551	S. 19 8 4.4	12.588	24	16 31 55.15	2.4494	S. 26 42 25.4	5.915

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 17.					THURSDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	16 31 55.15	2.4494	S. 26 42 25.4	5.915	0	18 30 5.00	2.4238	S. 28 14 8.2	2.066
1	16 34 22.19	2.4518	26 48 15.4	5.752	1	18 32 30.32	2.4202	28 11 59.5	2.224
2	16 36 49.37	2.4542	26 53 55.7	5.590	2	18 34 55.42	2.4163	28 9 41.3	2.382
3	16 39 16.69	2.4563	26 59 26.2	5.426	3	18 37 20.28	2.4124	28 7 13.6	2.539
4	16 41 44.13	2.4584	27 4 46.8	5.262	4	18 39 44.91	2.4084	28 4 36.6	2.695
5	16 44 11.70	2.4604	27 9 57.6	5.097	5	18 42 9.29	2.4043	28 1 50.2	2.851
6	16 46 39.39	2.4623	27 14 58.4	4.931	6	18 44 33.43	2.4002	27 58 54.5	3.006
7	16 49 7.18	2.4641	27 19 49.3	4.765	7	18 46 57.31	2.3958	27 55 49.5	3.159
8	16 51 35.07	2.4657	27 24 30.2	4.599	8	18 49 20.92	2.3912	27 52 35.4	3.311
9	16 54 3.06	2.4672	27 29 1.2	4.432	9	18 51 44.26	2.3867	27 49 12.2	3.463
10	16 56 31.14	2.4686	27 33 22.1	4.265	10	18 54 7.33	2.3822	27 45 39.8	3.615
11	16 58 59.29	2.4698	27 37 33.0	4.098	11	18 56 30.12	2.3774	27 41 58.4	3.764
12	17 1 27.52	2.4710	27 41 33.9	3.931	12	18 58 52.62	2.3726	27 38 8.1	3.913
13	17 3 55.81	2.4720	27 45 24.7	3.762	13	19 1 14.83	2.3677	27 34 8.8	4.062
14	17 6 24.16	2.4729	27 49 5.3	3.593	14	19 3 36.74	2.3627	27 30 0.7	4.208
15	17 8 52.56	2.4737	27 52 35.9	3.426	15	19 5 58.36	2.3577	27 25 43.8	4.354
16	17 11 21.00	2.4743	27 55 56.4	3.257	16	19 8 19.67	2.3525	27 21 18.2	4.499
17	17 13 49.48	2.4748	27 59 6.7	3.087	17	19 10 40.66	2.3473	27 16 43.9	4.642
18	17 16 17.98	2.4752	28 2 6.9	2.919	18	19 13 1.34	2.3420	27 12 1.0	4.786
19	17 18 46.50	2.4754	28 4 57.0	2.750	19	19 15 21.70	2.3366	27 7 9.6	4.928
20	17 21 15.03	2.4755	28 7 36.9	2.580	20	19 17 41.73	2.3311	27 2 9.7	5.068
21	17 23 43.56	2.4754	28 10 6.6	2.411	21	19 20 1.43	2.3256	26 57 1.4	5.208
22	17 26 12.08	2.4753	28 12 26.2	2.242	22	19 22 20.80	2.3200	26 51 44.7	5.347
23	17 28 40.60	2.4751	S. 28 14 35.6	2.072	23	19 24 39.83	2.3143	S. 26 46 19.8	5.484
	WEDNESDAY 18.					FRIDAY 20.			
0	17 31 9.09	2.4746	S. 28 16 34.9	1.903	0	19 26 58.52	2.3086	S. 26 40 46.7	5.620
1	17 33 37.55	2.4740	28 18 24.0	1.734	1	19 29 16.86	2.3028	26 35 5.4	5.755
2	17 36 5.97	2.4732	28 20 3.0	1.565	2	19 31 34.86	2.2971	26 29 16.1	5.888
3	17 38 34.34	2.4723	28 21 31.8	1.396	3	19 33 52.51	2.2912	26 23 18.8	6.022
4	17 41 2.65	2.4713	28 22 50.5	1.227	4	19 36 9.80	2.2852	26 17 13.5	6.153
5	17 43 30.90	2.4702	28 23 59.1	1.059	5	19 38 26.73	2.2792	26 11 0.4	6.283
6	17 45 59.08	2.4691	28 24 57.6	0.891	6	19 40 43.30	2.2732	26 4 39.5	6.412
7	17 48 27.18	2.4677	28 25 46.0	0.723	7	19 42 59.51	2.2672	25 58 10.9	6.540
8	17 50 55.20	2.4661	28 26 24.4	0.555	8	19 45 15.36	2.2610	25 51 34.7	6.667
9	17 53 23.12	2.4644	28 26 52.7	0.387	9	19 47 30.84	2.2549	25 44 50.9	6.792
10	17 55 50.93	2.4627	28 27 10.9	0.221	10	19 49 45.95	2.2487	25 37 59.6	6.917
11	17 58 18.64	2.4607	28 27 19.1	−0.054	11	19 52 0.68	2.2424	25 31 0.8	7.041
12	18 0 46.22	2.4586	28 27 17.4	+0.112	12	19 54 15.04	2.2362	25 23 54.7	7.162
13	18 3 13.67	2.4564	28 27 5.7	0.278	13	19 56 29.02	2.2299	25 16 41.3	7.282
14	18 5 40.99	2.4541	28 26 44.0	0.443	14	19 58 42.63	2.2237	25 9 20.7	7.402
15	18 8 8.16	2.4516	28 26 12.5	0.608	15	20 0 55.86	2.2173	25 1 53.0	7.521
16	18 10 35.18	2.4491	28 25 31.1	0.772	16	20 3 8.70	2.2109	24 54 18.3	7.637
17	18 13 2.04	2.4463	28 24 39.8	0.937	17	20 5 21.17	2.2047	24 46 36.6	7.753
18	18 15 28.74	2.4434	28 23 38.7	1.100	18	20 7 33.26	2.1983	24 38 47.9	7.868
19	18 17 55.26	2.4405	28 22 27.8	1.262	19	20 9 44.96	2.1918	24 30 52.4	7.982
20	18 20 21.60	2.4374	28 21 7.2	1.424	20	20 11 56.28	2.1854	24 22 50.1	8.093
21	18 22 47.75	2.4342	28 19 36.9	1.586	21	20 14 7.21	2.1790	24 14 41.2	8.204
22	18 25 13.71	2.4309	28 17 56.9	1.746	22	20 16 17.76	2.1726	24 6 25.6	8.314
23	18 27 39.46	2.4274	28 16 7.3	1.906	23	20 18 27.92	2.1662	23 58 3.5	8.422
24	18 30 5.00	2.4238	S. 28 14 8.2	2.066	24	20 20 37.70	2.1597	S. 23 49 34.9	8.530

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 21.					MONDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	20 20 37.70	2.1597	S. 23 49 34.9	8.530	0	21 57 18.91	1.8842	S. 15 19 7.2	12.316
1	20 22 47.09	2.1533	23 40 59.9	8.635	1	21 59 11.82	1.8797	15 6 46.6	12.369
2	20 24 56.10	2.1469	23 32 18.7	8.739	2	22 1 4.47	1.8752	14 54 22.9	12.422
3	20 27 4.72	2.1405	23 23 31.2	8.843	3	22 2 56.85	1.8707	14 41 56.0	12.473
4	20 29 12.96	2.1342	23 14 37.5	8.946	4	22 4 48.96	1.8664	14 29 26.1	12.523
5	20 31 20.82	2.1277	23 5 37.7	9.047	5	22 6 40.82	1.8622	14 16 53.2	12.573
6	20 33 28.29	2.1213	22 56 31.9	9.147	6	22 8 32.42	1.8580	14 4 17.3	12.622
7	20 35 35.38	2.1150	22 47 20.1	9.246	7	22 10 23.78	1.8539	13 51 38.5	12.671
8	20 37 42.09	2.1087	22 38 2.4	9.343	8	22 12 14.89	1.8498	13 38 56.8	12.718
9	20 39 48.42	2.1023	22 28 38.9	9.439	9	22 14 5.76	1.8458	13 26 12.3	12.764
10	20 41 54.37	2.0960	22 19 9.7	9.533	10	22 15 56.39	1.8418	13 13 25.1	12.809
11	20 43 59.94	2.0897	22 9 34.9	9.627	11	22 17 46.78	1.8380	13 0 35.2	12.854
12	20 46 5.13	2.0833	21 59 54.4	9.721	12	22 19 36.95	1.8342	12 47 42.6	12.898
13	20 48 9.94	2.0772	21 50 8.4	9.812	13	22 21 26.89	1.8305	12 34 47.4	12.941
14	20 50 14.39	2.0710	21 40 17.0	9.902	14	22 23 16.61	1.8268	12 21 49.7	12.983
15	20 52 18.46	2.0647	21 30 20.2	9.991	15	22 25 6.11	1.8232	12 8 49.4	13.025
16	20 54 22.15	2.0585	21 20 18.1	10.079	16	22 26 55.40	1.8197	11 55 46.7	13.065
17	20 56 25.48	2.0524	21 10 10.7	10.166	17	22 28 44.48	1.8163	11 42 41.6	13.105
18	20 58 28.44	2.0463	20 59 58.1	10.252	18	22 30 33.36	1.8130	11 29 34.1	13.144
19	21 0 31.04	2.0402	20 49 40.5	10.335	19	22 32 22.04	1.8097	11 16 24.3	13.182
20	21 2 33.27	2.0342	20 39 17.9	10.418	20	22 34 10.52	1.8064	11 3 12.3	13.219
21	21 4 35.14	2.0282	20 28 50.3	10.501	21	22 35 58.81	1.8033	10 49 58.0	13.256
22	21 6 36.65	2.0222	20 18 17.8	10.582	22	22 37 46.92	1.8002	10 36 41.6	13.292
23	21 8 37.80	2.0162	S. 20 7 40.4	10.662	23	22 39 34.84	1.7972	S. 10 23 23.0	13.327
	SUNDAY 22.					TUESDAY 24.			
0	21 10 38.60	2.0104	S. 19 56 58.3	10.741	0	22 41 22.59	1.7943	S. 10 10 2.4	13.361
1	21 12 39.05	2.0045	19 46 11.5	10.818	1	22 43 10.16	1.7915	9 56 39.7	13.394
2	21 14 39.14	1.9987	19 35 20.1	10.894	2	22 44 57.57	1.7887	9 43 15.0	13.427
3	21 16 38.89	1.9930	19 24 24.2	10.970	3	22 46 44.81	1.7860	9 29 48.4	13.460
4	21 18 38.30	1.9873	19 13 23.8	11.044	4	22 48 31.89	1.7833	9 16 19.9	13.491
5	21 20 37.37	1.9817	19 2 18.9	11.117	5	22 50 18.81	1.7807	9 2 49.6	13.521
6	21 22 36.10	1.9760	18 51 9.6	11.190	6	22 52 5.58	1.7782	8 49 17.4	13.551
7	21 24 34.49	1.9704	18 39 56.1	11.261	7	22 53 52.20	1.7759	8 35 43.4	13.581
8	21 26 32.55	1.9649	18 28 38.3	11.332	8	22 55 38.69	1.7737	8 22 7.7	13.608
9	21 28 30.28	1.9594	18 17 16.3	11.401	9	22 57 25.04	1.7713	8 8 30.4	13.636
10	21 30 27.68	1.9540	18 5 50.2	11.468	10	22 59 11.25	1.7692	7 54 51.4	13.663
11	21 32 24.76	1.9487	17 54 20.1	11.535	11	23 0 57.34	1.7671	7 41 10.8	13.690
12	21 34 21.52	1.9433	17 42 46.0	11.602	12	23 2 43.30	1.7650	7 27 28.6	13.716
13	21 36 17.96	1.9381	17 31 7.9	11.667	13	23 4 29.14	1.7631	7 13 44.9	13.740
14	21 38 14.09	1.9329	17 19 26.0	11.730	14	23 6 14.87	1.7612	6 59 59.8	13.764
15	21 40 9.91	1.9277	17 7 40.3	11.793	15	23 8 0.49	1.7594	6 46 13.2	13.788
16	21 42 5.42	1.9227	16 55 50.8	11.855	16	23 9 46.00	1.7577	6 32 25.2	13.811
17	21 44 0.63	1.9177	16 43 57.7	11.916	17	23 11 31.41	1.7561	6 18 35.9	13.833
18	21 45 55.54	1.9127	16 32 0.9	11.977	18	23 13 16.73	1.7545	6 4 45.2	13.855
19	21 47 50.15	1.9078	16 20 0.5	12.036	19	23 15 1.95	1.7530	5 50 53.3	13.875
20	21 49 44.48	1.9030	16 7 56.6	12.093	20	23 16 47.09	1.7516	5 37 0.2	13.896
21	21 51 38.51	1.8982	15 55 49.3	12.150	21	23 18 32.14	1.7502	5 23 5.8	13.916
22	21 53 32.26	1.8934	15 43 38.6	12.207	22	23 20 17.12	1.7490	5 9 10.3	13.934
23	21 55 25.72	1.8887	15 31 24.5	12.262	23	23 22 2.02	1.7478	4 55 13.7	13.952
24	21 57 18.91	1.8842	S. 15 19 7.2	12.316	24	23 23 46.86	1.7467	S. 4 41 16.0	13.970

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 25.			
	h m s	s	° ′ ″	″
0	23 23 46.86	1.7467	S. 4 41 16.0	13.970
1	23 25 31.63	1.7457	4 27 17.3	13.987
2	23 27 16.35	1.7448	4 13 17.6	14.003
3	23 29 1.01	1.7439	3 59 16.9	14.019
4	23 30 45.62	1.7431	3 45 15.3	14.034
5	23 32 30.18	1.7423	3 31 12.8	14.049
6	23 34 14.71	1.7417	3 17 9.4	14.062
7	23 35 59.20	1.7412	3 3 5.3	14.075
8	23 37 43.66	1.7408	2 49 0.4	14.087
9	23 39 28.10	1.7404	2 34 54.8	14.099
10	23 41 12.51	1.7401	2 20 48.5	14.111
11	23 42 56.91	1.7398	2 6 41.5	14.121
12	23 44 41.29	1.7397	1 52 34.0	14.130
13	23 46 25.67	1.7397	1 38 25.9	14.139
14	23 48 10.05	1.7397	1 24 17.3	14.147
15	23 49 54.43	1.7398	1 10 8.2	14.156
16	23 51 38.82	1.7399	0 55 58.6	14.163
17	23 53 23.22	1.7402	0 41 48.6	14.169
18	23 55 7.64	1.7405	0 27 38.3	14.175
19	23 56 52.08	1.7409	S. 0 13 27.6	14.181
20	23 58 36.55	1.7414	N. 0 0 43.4	14.186
21	0 0 21.05	1.7419	0 14 54.7	14.189
22	0 2 5.58	1.7426	0 29 6.1	14.192
23	0 3 50.16	1.7434	N. 0 43 17.8	14.196
	THURSDAY 26.			
0	0 5 34.79	1.7442	N. 0 57 29.6	14.198
1	0 7 19.47	1.7451	1 11 41.5	14.198
2	0 9 4.20	1.7460	1 25 53.4	14.199
3	0 10 48.99	1.7471	1 40 5.4	14.200
4	0 12 33.85	1.7482	1 54 17.4	14.199
5	0 14 18.78	1.7495	2 8 29.3	14.198
6	0 16 3.79	1.7508	2 22 41.1	14.196
7	0 17 48.88	1.7522	2 36 52.8	14.193
8	0 19 34.05	1.7537	2 51 4.3	14.190
9	0 21 19.32	1.7552	3 5 15.6	14.186
10	0 23 4.68	1.7568	3 19 26.6	14.181
11	0 24 50.14	1.7586	3 33 37.3	14.176
12	0 26 35.71	1.7604	3 47 47.7	14.170
13	0 28 21.39	1.7622	4 1 57.7	14.163
14	0 30 7.18	1.7642	4 16 7.3	14.156
15	0 31 53.09	1.7662	4 30 16.4	14.148
16	0 33 39.13	1.7684	4 44 25.0	14.138
17	0 35 25.30	1.7706	4 58 33.0	14.129
18	0 37 11.60	1.7729	5 12 40.5	14.119
19	0 38 58.05	1.7753	5 26 47.3	14.108
20	0 40 44.64	1.7777	5 40 53.4	14.096
21	0 42 31.38	1.7802	5 54 58.8	14.084
22	0 44 18.27	1.7828	6 9 3.5	14.072
23	0 46 5.32	1.7856	6 23 7.4	14.058
24	0 47 52.54	1.7884	N. 6 37 10.4	14.042

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 27.			
	h m s	s	° ′ ″	″
0	0 47 52.54	1.7884	N. 6 37 10.4	14.042
1	0 49 39.93	1.7913	6 51 12.5	14.027
2	0 51 27.50	1.7942	7 5 13.6	14.010
3	0 53 15.24	1.7972	7 19 13.7	13.993
4	0 55 3.17	1.8004	7 33 12.8	13.976
5	0 56 51.29	1.8037	7 47 10.8	13.957
6	0 58 39.61	1.8070	8 1 7.7	13.938
7	1 0 28.13	1.8104	8 15 3.4	13.918
8	1 2 16.86	1.8138	8 28 57.8	13.896
9	1 4 5.79	1.8173	8 42 50.9	13.875
10	1 5 54.94	1.8210	8 56 42.8	13.853
11	1 7 44.31	1.8247	9 10 33.3	13.829
12	1 9 33.91	1.8286	9 24 22.3	13.804
13	1 11 23.74	1.8324	9 38 9.8	13.779
14	1 13 13.80	1.8363	9 51 55.8	13.753
15	1 15 4.10	1.8404	10 5 40.2	13.727
16	1 16 54.65	1.8446	10 19 23.0	13.698
17	1 18 45.45	1.8487	10 33 4.0	13.669
18	1 20 36.50	1.8531	10 46 43.3	13.640
19	1 22 27.82	1.8575	11 0 20.8	13.610
20	1 24 19.40	1.8619	11 13 56.5	13.578
21	1 26 11.25	1.8665	11 27 30.2	13.546
22	1 28 3.38	1.8712	11 41 2.0	13.512
23	1 29 55.79	1.8758	N. 11 54 31.7	13.478
	SATURDAY 28.			
0	1 31 48.48	1.8806	N. 12 7 59.4	13.443
1	1 33 41.46	1.8855	12 21 24.9	13.407
2	1 35 34.74	1.8905	12 34 48.2	13.369
3	1 37 28.32	1.8956	12 48 9.2	13.331
4	1 39 22.21	1.9007	13 1 27.9	13.292
5	1 41 16.40	1.9058	13 14 44.3	13.252
6	1 43 10.91	1.9112	13 27 58.2	13.211
7	1 45 5.74	1.9166	13 41 9.6	13.168
8	1 47 0.90	1.9220	13 54 18.4	13.125
9	1 48 56.38	1.9275	14 7 24.6	13.081
10	1 50 52.20	1.9332	14 20 28.1	13.035
11	1 52 48.36	1.9388	14 33 28.8	12.988
12	1 54 44.86	1.9446	14 46 26.7	12.941
13	1 56 41.71	1.9505	14 59 21.7	12.892
14	1 58 38.92	1.9564	15 12 13.7	12.842
15	2 0 36.48	1.9623	15 25 2.7	12.791
16	2 2 34.40	1.9684	15 37 48.6	12.739
17	2 4 32.69	1.9747	15 50 31.4	12.686
18	2 6 31.36	1.9809	16 3 10.9	12.631
19	2 8 30.40	1.9872	16 15 47.1	12.575
20	2 10 29.82	1.9935	16 28 19.9	12.517
21	2 12 29.62	2.0000	16 40 49.2	12.459
22	2 14 29.82	2.0066	16 53 15.0	12.400
23	2 16 30.41	2.0131	17 5 37.2	12.339
24	2 18 31.39	2.0197	N. 17 17 55.7	12.277

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 29.			
	h m s	s	° ′ ″	″
0	2 18 31.39	2.0197	N.17 17 55.7	12.277
1	2 20 32.78	2.0265	17 30 10.4	12.213
2	2 22 34.57	2.0332	17 42 21.3	12.149
3	2 24 36.77	2.0402	17 54 28.3	12.083
4	2 26 39.39	2.0471	18 6 31.3	12.016
5	2 28 42.42	2.0541	18 18 30.2	11.948
6	2 30 45.88	2.0612	18 30 25.0	11.878
7	2 32 49.76	2.0682	18 42 15.5	11.806
8	2 34 54.07	2.0754	18 54 1.7	11.734
9	2 36 58.81	2.0827	19 5 43.6	11.661
10	2 39 4.00	2.0901	19 17 21.0	11.585
11	2 41 9.62	2.0974	19 28 53.8	11.508
12	2 43 15.69	2.1048	19 40 21.9	11.429
13	2 45 22.20	2.1122	19 51 45.3	11.350
14	2 47 29.16	2.1198	20 3 3.9	11.269
15	2 49 36.58	2.1275	20 14 17.6	11.187
16	2 51 44.46	2.1351	20 25 26.3	11.103
17	2 53 52.79	2.1427	20 36 29.9	11.017
18	2 56 1.59	2.1505	20 47 28.3	10.929
19	2 58 10.85	2.1582	20 58 21.4	10.841
20	3 0 20.58	2.1661	21 9 9.2	10.752
21	3 2 30.78	2.1739	21 19 51.6	10.660
22	3 4 41.45	2.1817	21 30 28.4	10.567
23	3 6 52.59	2.1897	N.21 40 59.6	10.472
	MONDAY 30.			
0	3 9 4.21	2.1977	N.21 51 25.1	10.376
1	3 11 16.31	2.2057	22 1 44.8	10.278
2	3 13 28.89	2.2137	22 11 58.5	10.179
3	3 15 41.96	2.2218	22 22 6.2	10.078
4	3 17 55.51	2.2298	22 32 7.8	9.976
5	3 20 9.54	2.2379	22 42 3.3	9.872
6	3 22 24.06	2.2461	22 51 52.4	9.765
7	3 24 39.07	2.2542	23 1 35.1	9.658
8	3 26 54.57	2.2624	23 11 11.3	9.549
9	3 29 10.56	2.2706	23 20 41.0	9.438
10	3 31 27.04	2.2788	23 30 4.0	9.327
11	3 33 44.02	2.2870	23 39 20.2	9.213
12	3 36 1.48	2.2951	23 48 29.5	9.097
13	3 38 19.43	2.3033	23 57 31.8	8.979
14	3 40 37.88	2.3116	24 6 27.0	8.861
15	3 42 56.82	2.3197	24 15 15.0	8.740
16	3 45 16.25	2.3279	24 23 55.8	8.618
17	3 47 36.17	2.3361	24 32 29.2	8.494
18	3 49 56.58	2.3442	24 40 55.1	8.368
19	3 52 17.48	2.3523	24 49 13.4	8.241
20	3 54 38.86	2.3605	24 57 24.0	8.112
21	3 57 0.73	2.3686	25 5 26.8	7.981
22	3 59 23.09	2.3767	25 13 21.7	7.848
23	4 1 45.93	2.3847	25 21 8.6	7.715
24	4 4 9.25	2.3927	N.25 28 47.5	7.580

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY, JULY 1.			
	h m s	s	° ′ ″	″
0	4 4 9.25	2.3927	N.25 28 47.5	7.580

PHASES OF THE MOON.

			d	h	m
●	New Moon . . .	June	4	7	57.0
☽	First Quarter		11	4	37.3
○	Full Moon		18	5	53.7
☾	Last Quarter		26	5	40.8

			d	h
☾	Perigee	June	9	16.5
☾	Apogee		24	14.7

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Tues.	1	6 39 14.97	10.350	N.23 8 46.6	− 9.71	15 45.66	68.76	3 30.57	0.491
Wed.	2	6 43 23.23	10.339	23 4 41.6	10.72	15 45.65	68.73	3 42.24	0.481
Thur.	3	6 47 31.23	10.328	23 0 12.3	11.72	15 45.64	68.69	3 53.65	0.470
Fri.	4	6 51 38.95	10.315	22 55 18.9	−12.72	15 45.64	68.65	4 4.78	0.457
Sat.	5	6 55 46.36	10.301	22 50 1.5	13.72	15 45.65	68.61	4 15.60	0.444
SUN.	6	6 59 53.43	10.286	22 44 20.2	14.71	15 45.66	68.56	4 26.09	0.429
Mon.	7	7 4 0.14	10.271	22 38 15.4	−15.70	15 45.67	68.51	4 36.21	0.414
Tues.	8	7 8 6.46	10.255	22 31 46.7	16.68	15 45.69	68.46	4 45.95	0.397
Wed.	9	7 12 12.38	10.238	22 24 54.7	17.65	15 45.72	68.40	4 55.28	0.380
Thur.	10	7 16 17.88	10.220	22 17 39.6	−18.61	15 45.76	68.34	5 4.19	0.362
Fri.	11	7 20 22.93	10.201	22 10 1.5	19.56	15 45.80	68.28	5 12.66	0.343
Sat.	12	7 24 27.52	10.182	22 2 0.5	20.51	15 45.84	68.22	5 20.67	0.324
SUN.	13	7 28 31.63	10.162	21 53 36.9	−21.45	15 45.88	68.16	5 28.21	0.304
Mon.	14	7 32 35.26	10.141	21 44 50.9	22.38	15 45.93	68.09	5 35.26	0.284
Tues.	15	7 36 38.39	10.120	21 35 42.7	23.30	15 45.99	68.02	5 41.81	0.263
Wed.	16	7 40 41.01	10.098	21 26 12.5	−24.21	15 46.05	67.95	5 47.86	0.242
Thur.	17	7 44 43.12	10.076	21 16 20.4	25.12	15 46.11	67.88	5 53.40	0.220
Fri.	18	7 48 44.70	10.054	21 6 6.7	26.02	15 46.17	67.80	5 58.41	0.198
Sat.	19	7 52 45.76	10.032	20 55 31.6	−26.90	15 46.23	67.73	6 2.90	0.176
SUN.	20	7 56 46.28	10.010	20 44 35.3	27.78	15 46.29	67.65	6 6.85	0.153
Mon.	21	8 0 46.25	9.987	20 33 18.1	28.64	15 46.36	67.57	6 10.25	0.130
Tues.	22	8 4 45.67	9.964	20 21 40.1	−29.50	15 46.44	67.49	6 13.10	0.107
Wed.	23	8 8 44.53	9.941	20 9 41.6	30.36	15 46.52	67.41	6 15.40	0.084
Thur.	24	8 12 42.83	9.918	19 57 22.9	31.20	15 46.60	67.32	6 17.14	0.061
Fri.	25	8 16 40.57	9.894	19 44 44.2	−32.02	15 46.69	67.24	6 18.31	0.037
Sat.	26	8 20 37.73	9.870	19 31 45.7	32.84	15 46.78	67.15	6 18.92	0.013
SUN.	27	8 24 34.31	9.846	19 18 27.7	33.65	15 46.88	67.07	6 18.95	0.011
Mon.	28	8 28 30.31	9.822	19 4 50.4	−34.45	15 46.98	66.98	6 18.40	0.035
Tues.	29	8 32 25.73	9.797	18 50 54.1	35.24	15 47.08	66.90	6 17.27	0.059
Wed.	30	8 36 20.56	9.773	18 36 39.1	36.01	15 47.19	66.81	6 15.55	0.084
Thur.	31	8 40 14.80	9.748	18 22 5.7	36.77	15 47.30	66.73	6 13.23	0.109
Fri.	32	8 44 8.44	9.723	N.18 7 14.1	−37.52	15 47.42	66.64	6 10.32	0.134

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting $0^s.19$ from the sidereal time.

The sign − prefixed to the hourly change of declination indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Tues.	1	6 39 14.36	10.348	N.23 8 47.2	− 9.70	3 30.53	0.491	6 35 43.82
Wed.	2	6 43 22.59	10.337	23 4 42.3	10.71	3 42.21	0.481	6 39 40.38
Thur.	3	6 47 30.56	10.326	23 0 13.1	11.72	3 53.62	0.470	6 43 36.94
Fri.	4	6 51 38.25	10.314	22 55 19.8	−12.72	4 4.75	0.457	6 47 33.50
Sat.	5	6 55 45.63	10.300	22 50 2.5	13.72	4 15.57	0.444	6 51 30.06
SUN.	6	6 59 52.67	10.285	22 44 21.3	14.71	4 26.06	0.429	6 55 26.61
Mon.	7	7 3 59.35	10.270	22 38 16.4	−15.69	4 36.18	0.414	6 59 23.17
Tues.	8	7 8 5.65	10.254	22 31 48.0	16.67	4 45.92	0.397	7 3 19.73
Wed.	9	7 12 11.54	10.237	22 24 56.2	17.64	4 55.25	0.380	7 7 16.29
Thur.	10	7 16 17.01	10.219	22 17 41.2	−18.60	5 4.16	0.362	7 11 12.85
Fri.	11	7 20 22.04	10.200	22 10 3.1	19.56	5 12.63	0.343	7 15 9.40
Sat.	12	7 24 26.61	10.181	22 2 2.3	20.51	5 20.64	0.324	7 19 5.96
SUN.	13	7 28 30.70	10.161	21 53 38.9	−21.44	5 28.18	0.304	7 23 2.52
Mon.	14	7 32 34.31	10.140	21 44 53.0	22.37	5 35.23	0.284	7 26 59.08
Tues.	15	7 36 37.43	10.119	21 35 44.9	23.30	5 41.79	0.263	7 30 55.64
Wed.	16	7 40 40.04	10.098	21 26 14.8	−24.21	5 47.84	0.242	7 34 52.20
Thur.	17	7 44 42.13	10.076	21 16 22.9	25.11	5 53.38	0.220	7 38 48.75
Fri.	18	7 48 43.70	10.054	21 6 9.3	26.01	5 58.39	0.198	7 42 45.31
Sat.	19	7 52 44.75	10.032	20 55 34.3	−26.90	6 2.88	0.176	7 46 41.87
SUN.	20	7 56 45.26	10.010	20 44 38.1	27.78	6 6.83	0.153	7 50 38.42
Mon.	21	8 0 45.22	9.987	20 33 21.0	28.64	6 10.24	0.130	7 54 34.98
Tues.	22	8 4 44.63	9.964	20 21 43.2	−29.50	6 13.10	0.107	7 58 31.54
Wed.	23	8 8 43.49	9.941	20 9 44.9	30.35	6 15.40	0.084	8 2 28.10
Thur.	24	8 12 41.79	9.918	19 57 26.2	31.19	6 17.14	0.061	8 6 24.66
Fri.	25	8 16 39.53	9.894	19 44 47.6	−32.02	6 18.31	0.037	8 10 21.21
Sat.	26	8 20 36.69	9.870	19 31 49.2	32.84	6 18.92	0.013	8 14 17.77
SUN.	27	8 24 33.27	9.846	19 18 31.2	33.65	6 18.95	0.011	8 18 14.33
Mon.	28	8 28 29.28	9.822	19 4 54.0	−34.45	6 18.40	0.035	8 22 10.88
Tues.	29	8 32 24.71	9.797	18 50 57.8	35.23	6 17.27	0.059	8 26 7.44
Wed.	30	8 36 19.55	9.773	18 36 42.9	36.00	6 15.54	0.084	8 30 4.00
Thur.	31	8 40 13.79	9.748	18 22 9.5	36.77	6 13.23	0.109	8 34 0.56
Fri.	32	8 44 7.44	9.723	N.18 7 18.0	−37.52	6 10.33	0.134	8 37 57.11

Note.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign − prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 Hour, $+9^s.8565$. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S True Longitude. λ			THE SUN'S True Longitude. λ′		THE SUN'S Diff. for 1 Hour.	THE SUN'S Latitude.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.		
		°	′	″	′	″	″	″			h	m	s
1	182	99	1	8.0	0	42.0	143.05	+0.29	0.007 2157	+ 2.7	17	21	25.10
2	183	99	58	21.3	57	55.2	143.05	0.32	0.007 2210	1.6	17	17	29.19
3	184	100	55	34.7	55	8.4	143.06	0.32	0.007 2236	+ 0.5	17	13	33.28
4	185	101	52	48.2	52	21.7	143.06	+0.29	0.007 2236	− 0.6	17	9	37.36
5	186	102	50	1.7	49	35.0	143.06	0.23	0.007 2209	1.7	17	5	41.45
6	187	103	47	15.1	46	48.2	143.06	0.14	0.007 2155	2.8	17	1	45.54
7	188	104	44	28.4	44	1.3	143.05	+0.03	0.007 2075	− 3.9	16	57	49.63
8	189	105	41	41.6	41	14.3	143.05	−0.10	0.007 1970	4.9	16	53	53.71
9	190	106	38	54.7	38	27.2	143.04	0.24	0.007 1841	5.9	16	49	57.80
10	191	107	36	7.6	35	40.0	143.04	−0.36	0.007 1690	− 6.8	16	46	1.89
11	192	108	33	20.5	32	52.7	143.04	0.48	0.007 1518	7.6	16	42	5.98
12	193	109	30	33.3	30	5.3	143.04	0.59	0.007 1326	8.4	16	38	10.06
13	194	110	27	46.1	27	17.9	143.04	−0.68	0.007 1116	− 9.1	16	34	14.15
14	195	111	24	59.0	24	30.6	143.05	0.74	0.007 0889	9.8	16	30	18.24
15	196	112	22	12.0	21	43.4	143.05	0.78	0.007 0647	10.4	16	26	22.33
16	197	113	19	25.2	18	56.4	143.06	−0.78	0.007 0389	−11.0	16	22	26.42
17	198	114	16	38.7	16	9.8	143.07	0.75	0.007 0117	11.6	16	18	30.50
18	199	115	13	52.5	13	23.5	143.09	0.70	0.006 9831	12.2	16	14	34.59
19	200	116	11	6.9	10	37.7	143.11	−0.63	0.006 9530	−12.8	16	10	38.68
20	201	117	8	21.9	7	52.5	143.13	0.54	0.006 9215	13.4	16	6	42.77
21	202	118	5	37.5	5	7.9	143.16	0.42	0.006 8885	14.0	16	2	46.86
22	203	119	2	53.8	2	24.0	143.19	−0.30	0.006 8539	−14.7	15	58	50.95
23	204	119	60	10.8	59	40.9	143.23	0.18	0.006 8177	15.4	15	54	55.03
24	205	120	57	28.7	56	58.6	143.26	−0.06	0.006 7799	16.1	15	50	59.12
25	206	121	54	47.5	54	17.2	143.30	+0.05	0.006 7404	−16.9	15	47	3.21
26	207	122	52	7.3	51	36.8	143.34	0.15	0.006 6990	17.7	15	43	7.30
27	208	123	49	28.0	48	57.4	143.38	0.23	0.006 6557	18.5	15	39	11.39
28	209	124	46	49.7	46	18.9	143.42	+0.29	0.006 6104	−19.4	15	35	15.48
29	210	125	44	12.4	43	41.5	143.47	0.33	0.006 5630	20.4	15	31	19.57
30	211	126	41	36.2	41	5.2	143.51	0.33	0.006 5133	21.3	15	27	23.66
31	212	127	39	1.1	38	29.9	143.56	0.31	0.006 4613	22.3	15	23	27.74
32	213	128	36	27.0	35	55.6	143.60	+0.25	0.006 4069	−23.3	15	19	31.83

Note.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ′ are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour.
−9s.8296.
(Table II.)

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 38.9	15 45.4	57 19.98	+1.997	57 43.87	+1.978	22 20.0	2.48	26.7
2	15 51.8	15 57.9	58 7.26	1.913	58 29.64	1.809	23 21.4	2.60	27.7
3	16 3.6	16 8.8	58 50.55	1.667	59 9.52	1.487	б	. .	28.7
4	16 13.3	16 17.1	59 26.13	+1.275	59 40.03	+1.038	0 24.2	2.60	0.3
5	16 20.1	16 22.2	59 50.96	0.781	59 58.75	+0.517	1 25.5	2.49	1.3
6	16 23.4	16 23.8	60 3.36	+0.252	60 4.83	−0.004	2 23.2	2.32	2.3
7	16 23.4	16 22.2	60 3.31	−0.246	59 59.00	−0.467	3 16.9	2.16	3.3
8	16 20.4	16 17.9	59 52.19	0.663	59 43.20	0.831	4 7.2	2.05	4.3
9	16 15.0	16 11.6	59 32.37	0.970	59 20.01	1.084	4 55.5	1.99	5.3
10	16 7.9	16 4.0	59 6.44	−1.172	58 51.98	−1.234	5 43.1	1.99	6.3
11	15 59.9	15 55.6	58 36.89	1.278	58 21.38	1.304	6 31.5	2.05	7.3
12	15 51.3	15 47.0	58 5.62	1.320	57 49.76	1.323	7 21.8	2.15	8.3
13	15 42.7	15 38.4	57 33.90	−1.319	57 18.13	−1.308	8 14.7	2.26	9.3
14	15 34.2	15 29.9	57 2.51	1.294	56 47.08	1.277	9 10.0	2.34	10.3
15	15 25.8	15 21.7	56 31.86	1.259	56 16.90	1.234	10 6.6	2.36	11.3
16	15 17.7	15 13.8	56 2.26	−1.205	55 48.01	−1.170	11 2.8	2.30	12.3
17	15 10.1	15 6.5	55 34.20	1.130	55 20.91	1.082	11 56.7	2.18	13.3
18	15 3.0	14 59.8	55 8.27	1.023	54 56.41	0.954	12 47.1	2.02	14.3
19	14 56.8	14 54.1	54 45.44	−0.872	54 35.52	−0.778	13 33.7	1.87	15.3
20	14 51.7	14 49.7	54 26.81	0.670	54 19.47	0.550	14 16.9	1.74	16.3
21	14 48.2	14 47.0	54 13.67	0.415	54 9.57	−0.267	14 57.5	1.65	17.3
22	14 46.4	14 46.4	54 7.31	−0.106	54 7.06	+0.066	15 36.6	1.61	18.3
23	14 46.9	14 48.0	54 8.95	+0.251	54 13.10	0.442	16 15.3	1.62	19.3
24	14 49.8	14 52.2	54 19.60	0.643	54 28.52	0.846	16 54.8	1.68	20.3
25	14 55.3	14 59.0	54 39.89	+1.049	54 53.71	+1.254	17 36.3	1.79	21.3
26	15 3.5	15 8.5	55 9.96	1.453	55 28.54	1.640	18 21.0	1.95	22.3
27	15 14.2	15 20.4	55 49.29	1.814	56 12.02	1.969	19 10.1	2.15	23.3
28	15 27.1	15 34.1	56 36.47	+2.100	57 2.31	+2.200	20 4.3	2.36	24.3
29	15 41.4	15 48.8	57 29.13	2.260	57 56.45	2.284	21 3.3	2.54	25.3
30	15 56.3	16 3.6	58 23.75	2.259	58 50.43	2.180	22 5.4	2.61	26.3
31	16 10.5	16 16.9	59 15.85	2.047	59 39.36	1.862	23 8.0	2.56	27.3
32	16 22.6	16 27.5	60 0.35	+1.628	60 18.26	+1.350	б	. .	28.3

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 1.					THURSDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	4 4 9.25	2.3927	N.25 28 47.5	7.580	0	6 6 39.81	2.6637	N.28 27 14.6	0.690
1	4 6 33.05	2.4007	25 36 18.2	7.442	1	6 9 19.69	2.6656	28 26 30.9	0.826
2	4 8 57.33	2.4086	25 43 40.5	7.303	2	6 11 59.68	2.6673	28 25 35.5	1.022
3	4 11 22.08	2.4164	25 50 54.5	7.162	3	6 14 39.77	2.6689	28 24 28.3	1.218
4	4 13 47.30	2.4242	25 58 0.0	7.019	4	6 17 19.95	2.6703	28 23 9.3	1.415
5	4 16 12.99	2.4320	26 4 56.8	6.875	5	6 20 0.20	2.6714	28 21 38.5	1.612
6	4 18 39.14	2.4397	26 11 45.0	6.730	6	6 22 40.52	2.6725	28 19 55.9	1.809
7	4 21 5.75	2.4473	26 18 24.4	6.583	7	6 25 20.90	2.6733	28 18 1.4	2.007
8	4 23 32.82	2.4550	26 24 54.9	6.433	8	6 28 1.32	2.6739	28 15 55.1	2.204
9	4 26 0.35	2.4625	26 31 16.4	6.283	9	6 30 41.77	2.6743	28 13 36.9	2.402
10	4 28 28.32	2.4699	26 37 28.9	6.132	10	6 33 22.24	2.6746	28 11 6.8	2.600
11	4 30 56.74	2.4773	26 43 32.2	5.978	11	6 36 2.72	2.6747	28 8 24.9	2.797
12	4 33 25.60	2.4846	26 49 26.2	5.822	12	6 38 43.20	2.6745	28 5 31.2	2.994
13	4 35 54.89	2.4918	26 55 10.8	5.665	13	6 41 23.66	2.6742	28 2 25.6	3.192
14	4 38 24.61	2.4989	27 0 46.0	5.507	14	6 44 4.10	2.6737	27 59 8.2	3.389
15	4 40 54.76	2.5060	27 6 11.7	5.347	15	6 46 44.50	2.6729	27 55 38.9	3.587
16	4 43 25.33	2.5129	27 11 27.7	5.186	16	6 49 24.85	2.6720	27 51 57.8	3.785
17	4 45 56.31	2.5197	27 16 34.0	5.023	17	6 52 5.14	2.6710	27 48 4.9	3.979
18	4 48 27.69	2.5264	27 21 30.5	4.858	18	6 54 45.37	2.6698	27 44 0.3	4.175
19	4 50 59.48	2.5331	27 26 17.0	4.692	19	6 57 25.52	2.6683	27 39 43.9	4.371
20	4 53 31.66	2.5396	27 30 53.5	4.525	20	7 0 5.57	2.6667	27 35 15.8	4.566
21	4 56 4.23	2.5460	27 35 20.0	4.357	21	7 2 45.52	2.6650	27 30 36.0	4.760
22	4 58 37.18	2.5522	27 39 36.3	4.186	22	7 5 25.37	2.6631	27 25 44.6	4.954
23	5 1 10.50	2.5584	N.27 43 42.3	4.014	23	7 8 5.09	2.6609	N.27 20 41.5	5.148
	WEDNESDAY 2.					FRIDAY 4.			
0	5 3 44.19	2.5645	N.27 47 38.0	3.842	0	7 10 44.68	2.6586	N.27 15 26.8	5.342
1	5 6 18.24	2.5704	27 51 23.3	3.668	1	7 13 24.12	2.6561	27 10 0.5	5.533
2	5 8 52.64	2.5762	27 54 58.1	3.492	2	7 16 3.41	2.6535	27 4 22.8	5.724
3	5 11 27.38	2.5818	27 58 22.3	3.315	3	7 18 42.54	2.6507	26 58 33.6	5.915
4	5 14 2.45	2.5873	28 1 35.9	3.137	4	7 21 21.49	2.6477	26 52 33.0	6.105
5	5 16 37.85	2.5927	28 4 38.8	2.958	5	7 24 0.26	2.6446	26 46 21.0	6.294
6	5 19 13.57	2.5978	28 7 30.9	2.777	6	7 26 38.84	2.6413	26 39 57.7	6.482
7	5 21 49.59	2.6028	28 10 12.1	2.596	7	7 29 17.22	2.6379	26 33 23.1	6.669
8	5 24 25.91	2.6078	28 12 42.4	2.413	8	7 31 55.39	2.6344	26 26 37.4	6.855
9	5 27 2.52	2.6126	28 15 1.7	2.230	9	7 34 33.35	2.6307	26 19 40.5	7.041
10	5 29 39.42	2.6172	28 17 10.0	2.046	10	7 37 11.08	2.6268	26 12 32.5	7.225
11	5 32 16.59	2.6217	28 19 7.2	1.860	11	7 39 48.57	2.6228	26 5 13.5	7.408
12	5 34 54.02	2.6259	28 20 53.2	1.673	12	7 42 25.82	2.6187	25 57 43.5	7.591
13	5 37 31.70	2.6300	28 22 28.0	1.485	13	7 45 2.81	2.6144	25 50 2.6	7.771
14	5 40 9.62	2.6340	28 23 51.4	1.296	14	7 47 39.55	2.6101	25 42 11.0	7.950
15	5 42 47.78	2.6378	28 25 3.5	1.107	15	7 50 16.02	2.6056	25 34 8.6	8.128
16	5 45 26.15	2.6413	28 26 4.2	0.917	16	7 52 52.22	2.6010	25 25 55.6	8.305
17	5 48 4.73	2.6447	28 26 53.5	0.726	17	7 55 28.14	2.5962	25 17 32.0	8.481
18	5 50 43.52	2.6480	28 27 31.3	0.533	18	7 58 3.77	2.5914	25 8 57.9	8.655
19	5 53 22.49	2.6510	28 27 57.5	0.341	19	8 0 39.11	2.5865	25 0 13.4	8.828
20	5 56 1.64	2.6539	28 28 12.2	+0.148	20	8 3 14.15	2.5814	24 51 18.5	9.000
21	5 58 40.96	2.6566	28 28 15.3	−0.046	21	8 5 48.88	2.5762	24 42 13.4	9.170
22	6 1 20.43	2.6591	28 28 6.7	0.240	22	8 8 23.30	2.5710	24 32 58.1	9.338
23	6 4 0.05	2.6615	28 27 46.5	0.434	23	8 10 57.40	2.5657	24 23 32.8	9.505
24	6 6 39.81	2.6637	N.28 27 14.6	0.690	24	8 13 31.18	2.5603	N.24 13 57.5	9.671

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SATURDAY 5.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	8 13 31.18	2.5603	N.24 13 57.5	9.671
1	8 16 4.63	2.5547	24 4 12.3	9.834
2	8 18 37.74	2.5490	23 54 17.4	9.996
3	8 21 10.51	2.5434	23 44 12.8	10.158
4	8 23 42.94	2.5377	23 33 58.5	10.317
5	8 26 15.03	2.5319	23 23 34.7	10.475
6	8 28 46.77	2.5260	23 13 1.5	10.631
7	8 31 18.15	2.5200	23 2 19.0	10.785
8	8 33 49.17	2.5140	22 51 27.3	10.937
9	8 36 19.83	2.5080	22 40 26.5	11.088
10	8 38 50.13	2.5019	22 29 16.7	11.237
11	8 41 20.06	2.4958	22 17 58.0	11.385
12	8 43 49.62	2.4896	22 6 30.5	11.530
13	8 46 18.81	2.4833	21 54 54.4	11.673
14	8 48 47.62	2.4770	21 43 9.7	11.815
15	8 51 16.05	2.4708	21 31 16.6	11.955
16	8 53 44.11	2.4645	21 19 15.1	12.093
17	8 56 11.79	2.4582	21 7 5.4	12.229
18	8 58 39.09	2.4518	20 54 47.6	12.364
19	9 1 6.01	2.4454	20 42 21.7	12.497
20	9 3 32.54	2.4390	20 29 48.0	12.627
21	9 5 58.69	2.4327	20 17 6.5	12.756
22	9 8 24.46	2.4262	20 4 17.3	12.883
23	9 10 49.84	2.4198	N.19 51 20.5	13.008

SUNDAY 6.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	9 13 14.84	2.4135	N.19 38 16.3	13.131
1	9 15 39.46	2.4071	19 25 4.8	13.252
2	9 18 3.69	2.4007	19 11 46.0	13.372
3	9 20 27.54	2.3942	18 58 20.2	13.488
4	9 22 51.00	2.3879	18 44 47.4	13.603
5	9 25 14.09	2.3817	18 31 7.8	13.717
6	9 27 36.80	2.3753	18 17 21.4	13.828
7	9 29 59.12	2.3689	18 3 28.4	13.938
8	9 32 21.07	2.3627	17 49 28.8	14.046
9	9 34 42.65	2.3565	17 35 22.9	14.151
10	9 37 3.85	2.3502	17 21 10.7	14.254
11	9 39 24.67	2.3440	17 6 52.4	14.356
12	9 41 45.13	2.3379	16 52 28.0	14.456
13	9 44 5.22	2.3318	16 37 57.7	14.553
14	9 46 24.94	2.3257	16 23 21.6	14.649
15	9 48 44.30	2.3197	16 8 39.8	14.742
16	9 51 3.30	2.3137	15 53 52.5	14.834
17	9 53 21.94	2.3077	15 38 59.7	14.924
18	9 55 40.23	2.3018	15 24 1.6	15.012
19	9 57 58.16	2.2959	15 8 58.3	15.098
20	10 0 15.74	2.2902	14 53 49.8	15.182
21	10 2 32.98	2.2845	14 38 36.4	15.264
22	10 4 49.88	2.2788	14 23 18.1	15.345
23	10 7 6.44	2.2732	14 7 55.0	15.423
24	10 9 22.66	2.2676	N.13 52 27.3	15.499

MONDAY 7.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	10 9 22.66	2.2676	N.13 52 27.3	15.499
1	10 11 38.55	2.2622	13 36 55.1	15.574
2	10 13 54.12	2.2567	13 21 18.4	15.647
3	10 16 9.36	2.2513	13 5 37.4	15.717
4	10 18 24.28	2.2461	12 49 52.3	15.786
5	10 20 38.89	2.2408	12 34 3.1	15.853
6	10 22 53.18	2.2357	12 18 9.9	15.918
7	10 25 7.17	2.2306	12 2 12.9	15.982
8	10 27 20.85	2.2256	11 46 12.2	16.043
9	10 29 34.24	2.2207	11 30 7.8	16.102
10	10 31 47.33	2.2158	11 13 59.9	16.160
11	10 34 0.13	2.2109	10 57 48.6	16.216
12	10 36 12.64	2.2062	10 41 34.0	16.270
13	10 38 24.87	2.2016	10 25 16.2	16.322
14	10 40 36.83	2.1971	10 8 55.4	16.372
15	10 42 48.52	2.1926	9 52 31.6	16.420
16	10 44 59.94	2.1882	9 36 5.0	16.467
17	10 47 11.10	2.1839	9 19 35.6	16.512
18	10 49 22.01	2.1797	9 3 3.6	16.554
19	10 51 32.66	2.1755	8 46 29.1	16.596
20	10 53 43.07	2.1714	8 29 52.1	16.636
21	10 55 53.23	2.1674	8 13 12.8	16.674
22	10 58 3.16	2.1636	7 56 31.2	16.710
23	11 0 12.86	2.1598	N. 7 39 47.6	16.743

TUESDAY 8.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	11 2 22.34	2.1562	N. 7 23 2.0	16.776
1	11 4 31.60	2.1525	7 6 14.5	16.807
2	11 6 40.64	2.1489	6 49 25.2	16.837
3	11 8 49.47	2.1455	6 32 34.1	16.864
4	11 10 58.10	2.1422	6 15 41.5	16.889
5	11 13 6.53	2.1389	5 58 47.4	16.913
6	11 15 14.77	2.1357	5 41 51.9	16.936
7	11 17 22.82	2.1327	5 24 55.1	16.957
8	11 19 30.69	2.1297	5 7 57.1	16.976
9	11 21 38.38	2.1268	4 50 58.0	16.993
10	11 23 45.90	2.1240	4 33 57.9	17.009
11	11 25 53.26	2.1213	4 16 56.9	17.023
12	11 28 0.46	2.1187	3 59 55.1	17.036
13	11 30 7.50	2.1161	3 42 52.6	17.047
14	11 32 14.39	2.1137	3 25 49.5	17.057
15	11 34 21.14	2.1114	3 8 45.8	17.065
16	11 36 27.76	2.1092	2 51 41.7	17.071
17	11 38 34.24	2.1069	2 34 37.3	17.075
18	11 40 40.59	2.1049	2 17 32.7	17.078
19	11 42 46.83	2.1030	2 0 27.9	17.080
20	11 44 52.95	2.1011	1 43 23.1	17.080
21	11 46 58.96	2.0993	1 26 18.3	17.078
22	11 49 4.86	2.0976	1 9 13.7	17.075
23	11 51 10.67	2.0960	0 52 9.3	17.071
24	11 53 16.39	2.0946	N. 0 35 5.2	17.065

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
WEDNESDAY 9.					FRIDAY 11.				
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	11 53 16.39	2.0946	N. 0 35 5.2	17.065	0	13 33 49.56	2.1282	S.12 29 29.0	15.097
1	11 55 22.02	2.0932	0 18 1.5	17.057	1	13 35 57.33	2.1308	12 44 32.6	15.023
2	11 57 27.57	2.0918	N. 0 0 58.4	17.047	2	13 38 5.26	2.1335	12 59 31.7	14.948
3	11 59 33.04	2.0907	S. 0 16 4.1	17.036	3	13 40 13.35	2.1363	13 14 26.3	14.871
4	12 1 38.45	2.0896	0 33 5.9	17.024	4	13 42 21.62	2.1392	13 29 16.2	14.793
5	12 3 43.79	2.0885	0 50 7.0	17.011	5	13 44 30.06	2.1422	13 44 1.4	14.714
6	12 5 49.07	2.0876	1 7 7.2	16.996	6	13 46 38.68	2.1452	13 58 41.9	14.634
7	12 7 54.30	2.0868	1 24 6.5	16.979	7	13 48 47.48	2.1482	14 13 17.5	14.552
8	12 9 59.48	2.0860	1 41 4.7	16.961	8	13 50 56.46	2.1513	14 27 48.1	14.468
9	12 12 4.62	2.0853	1 58 1.8	16.941	9	13 53 5.64	2.1546	14 42 13.7	14.385
10	12 14 9.72	2.0847	2 14 57.6	16.919	10	13 55 15.01	2.1578	14 56 34.3	14.300
11	12 16 14.79	2.0843	2 31 52.1	16.897	11	13 57 24.57	2.1610	15 10 49.7	14.213
12	12 18 19.84	2.0840	2 48 45.3	16.874	12	13 59 34.33	2.1643	15 24 59.8	14.124
13	12 20 24.87	2.0837	3 5 37.0	16.848	13	14 1 44.29	2.1677	15 39 4.6	14.035
14	12 22 29.88	2.0834	3 22 27.1	16.822	14	14 3 54.46	2.1712	15 53 4.0	13.944
15	12 24 34.89	2.0834	3 39 15.6	16.793	15	14 6 4.84	2.1747	16 6 57.9	13.852
16	12 26 39.89	2.0833	3 56 2.3	16.763	16	14 8 15.42	2.1782	16 20 46.3	13.760
17	12 28 44.89	2.0834	4 12 47.2	16.732	17	14 10 26.22	2.1818	16 34 29.1	13.665
18	12 30 49.90	2.0837	4 29 30.2	16.700	18	14 12 37.24	2.1855	16 48 6.1	13.569
19	12 32 54.93	2.0839	4 46 11.2	16.667	19	14 14 48.48	2.1892	17 1 37.4	13.473
20	12 34 59.97	2.0842	5 2 50.2	16.632	20	14 16 59.94	2.1928	17 15 2.9	13.375
21	12 37 5.04	2.0847	5 19 27.0	16.595	21	14 19 11.62	2.1966	17 28 22.4	13.275
22	12 39 10.14	2.0852	5 36 1.6	16.557	22	14 21 23.53	2.2004	17 41 35.9	13.174
23	12 41 15.27	2.0858	S. 5 52 33.8	16.518	23	14 23 35.67	2.2042	S.17 54 43.3	13.072
THURSDAY 10.					SATURDAY 12.				
0	12 43 20.44	2.0866	S. 6 9 3.7	16.477	0	14 25 48.04	2.2081	S.18 7 44.6	12.969
1	12 45 25.66	2.0874	6 25 31.1	16.435	1	14 28 0.64	2.2120	18 20 39.6	12.865
2	12 47 30.93	2.0883	6 41 55.9	16.392	2	14 30 13.48	2.2160	18 33 28.4	12.760
3	12 49 36.25	2.0892	6 58 18.1	16.347	3	14 32 26.56	2.2200	18 46 10.8	12.653
4	12 51 41.63	2.0902	7 14 37.6	16.301	4	14 34 39.88	2.2240	18 58 46.8	12.545
5	12 53 47.08	2.0914	7 30 54.2	16.253	5	14 36 53.44	2.2280	19 11 16.2	12.435
6	12 55 52.60	2.0927	7 47 7.9	16.204	6	14 39 7.24	2.2320	19 23 39.0	12.325
7	12 57 58.20	2.0939	8 3 18.7	16.154	7	14 41 21.28	2.2361	19 35 55.2	12.214
8	13 0 3.87	2.0952	8 19 26.4	16.102	8	14 43 35.57	2.2402	19 48 4.7	12.101
9	13 2 9.63	2.0967	8 35 31.0	16.049	9	14 45 50.11	2.2444	20 0 7.3	11.987
10	13 4 15.48	2.0983	8 51 32.3	15.995	10	14 48 4.90	2.2485	20 12 3.1	11.872
11	13 6 21.43	2.1000	9 7 30.4	15.940	11	14 50 19.93	2.2526	20 23 52.0	11.756
12	13 8 27.48	2.1017	9 23 25.1	15.883	12	14 52 35.21	2.2567	20 35 33.8	11.638
13	13 10 33.63	2.1034	9 39 16.3	15.824	13	14 54 50.74	2.2609	20 47 8.5	11.519
14	13 12 39.89	2.1053	9 55 4.0	15.765	14	14 57 6.52	2.2651	20 58 36.1	11.400
15	13 14 46.27	2.1073	10 10 48.1	15.704	15	14 59 22.55	2.2692	21 9 56.5	11.279
16	13 16 52.76	2.1093	10 26 28.5	15.642	16	15 1 38.83	2.2734	21 21 9.6	11.157
17	13 18 59.38	2.1114	10 42 5.1	15.578	17	15 3 55.36	2.2776	21 32 15.3	11.033
18	13 21 6.13	2.1136	10 57 37.8	15.513	18	15 6 12.14	2.2818	21 43 13.6	10.908
19	13 23 13.01	2.1158	11 13 6.6	15.447	19	15 8 29.18	2.2861	21 54 4.3	10.783
20	13 25 20.03	2.1182	11 28 31.4	15.379	20	15 10 46.47	2.2902	22 4 47.5	10.657
21	13 27 27.19	2.1205	11 43 52.1	15.311	21	15 13 4.00	2.2943	22 15 23.1	10.529
22	13 29 34.49	2.1230	11 59 8.7	15.241	22	15 15 21.78	2.2985	22 25 51.0	10.400
23	13 31 41.95	2.1256	12 14 21.0	15.169	23	15 17 39.82	2.3027	22 36 11.1	10.270
24	13 33 49.56	2.1282	S.12 29 29.0	15.097	24	15 19 58.10	2.3068	S.22 46 23.4	10.139

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 13.					TUESDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	15 19 58.10	2.3068	S. 22 46 23.4	10.139	0	17 14 33.01	2.4384	S. 28 4 55.7	2.869
1	15 22 16.63	2.3108	22 56 27.8	10.007	1	17 16 59.33	2.4389	28 7 42.9	2.705
2	15 24 35.40	2.3149	23 6 24.2	9.873	2	17 19 25.68	2.4392	28 10 20.3	2.542
3	15 26 54.42	2.3190	23 16 12.6	9.740	3	17 21 52.04	2.4395	28 12 47.9	2.378
4	15 29 13.68	2.3230	23 25 53.0	9.605	4	17 24 18.42	2.4397	28 15 5.6	2.213
5	15 31 33.18	2.3271	23 35 25.2	9.468	5	17 26 44.80	2.4396	28 17 13.4	2.048
6	15 33 52.93	2.3311	23 44 49.2	9.331	6	17 29 11.17	2.4394	28 19 11.4	1.884
7	15 36 12.91	2.3349	23 54 4.9	9.193	7	17 31 37.53	2.4392	28 20 59.5	1.720
8	15 38 33.12	2.3388	24 3 12.3	9.053	8	17 34 3.87	2.4388	28 22 37.8	1.556
9	15 40 53.56	2.3427	24 12 11.3	8.913	9	17 36 30.19	2.4384	28 24 6.2	1.392
10	15 43 14.24	2.3466	24 21 1.8	8.772	10	17 38 56.48	2.4378	28 25 24.8	1.227
11	15 45 35.15	2.3503	24 29 43.9	8.630	11	17 41 22.72	2.4370	28 26 33.5	1.063
12	15 47 56.28	2.3540	24 38 17.4	8.487	12	17 43 48.92	2.4362	28 27 32.4	0.900
13	15 50 17.63	2.3577	24 46 42.3	8.343	13	17 46 15.06	2.4351	28 28 21.5	0.736
14	15 52 39.21	2.3614	24 54 58.5	8.198	14	17 48 41.13	2.4339	28 29 0.7	0.573
15	15 55 1.00	2.3649	25 3 6.0	8.052	15	17 51 7.13	2.4327	28 29 30.2	0.410
16	15 57 23.00	2.3685	25 11 4.7	7.905	16	17 53 33.06	2.4314	28 29 49.9	0.247
17	15 59 45.22	2.3720	25 18 54.6	7.757	17	17 55 58.90	2.4298	28 29 59.8	−0.084
18	16 2 7.64	2.3754	25 26 35.6	7.609	18	17 58 24.64	2.4282	28 30 0.0	+0.078
19	16 4 30.27	2.3787	25 34 7.7	7.461	19	18 0 50.28	2.4265	28 29 50.5	0.240
20	16 6 53.09	2.3820	25 41 30.9	7.311	20	18 3 15.82	2.4247	28 29 31.2	0.402
21	16 9 16.11	2.3852	25 48 45.0	7.160	21	18 5 41.24	2.4227	28 29 2.2	0.563
22	16 11 39.32	2.3883	25 55 50.1	7.008	22	18 8 6.54	2.4206	28 28 23.6	0.723
23	16 14 2.71	2.3914	S. 26 2 46.0	6.856	23	18 10 31.71	2.4183	S. 28 27 35.4	0.883
	MONDAY 14.					WEDNESDAY 16.			
0	16 16 26.29	2.3945	S. 26 9 32.8	6.703	0	18 12 56.74	2.4160	S. 28 26 37.6	1.043
1	16 18 50.05	2.3974	26 16 10.4	6.549	1	18 15 21.63	2.4135	28 25 30.2	1.203
2	16 21 13.98	2.4002	26 22 38.7	6.395	2	18 17 46.36	2.4109	28 24 13.2	1.362
3	16 23 38.08	2.4030	26 28 57.8	6.240	3	18 20 10.94	2.4082	28 22 46.7	1.521
4	16 26 2.34	2.4057	26 35 7.5	6.084	4	18 22 35.35	2.4054	28 21 10.7	1.678
5	16 28 26.76	2.4083	26 41 7.9	5.928	5	18 24 59.59	2.4026	28 19 25.3	1.835
6	16 30 51.33	2.4108	26 46 58.9	5.771	6	18 27 23.66	2.3996	28 17 30.5	1.992
7	16 33 16.05	2.4132	26 52 40.4	5.613	7	18 29 47.54	2.3963	28 15 26.3	2.148
8	16 35 40.91	2.4154	26 58 12.5	5.456	8	18 32 11.22	2.3931	28 13 12.8	2.303
9	16 38 5.90	2.4177	27 3 35.1	5.298	9	18 34 34.71	2.3898	28 10 49.9	2.459
10	16 40 31.03	2.4198	27 8 48.2	5.138	10	18 36 57.99	2.3863	28 8 17.7	2.613
11	16 42 56.28	2.4218	27 13 51.7	4.978	11	18 39 21.06	2.3827	28 5 36.4	2.765
12	16 45 21.65	2.4237	27 18 45.6	4.818	12	18 41 43.91	2.3790	28 2 45.9	2.917
13	16 47 47.13	2.4256	27 23 29.9	4.658	13	18 44 6.54	2.3752	27 59 46.3	3.069
14	16 50 12.72	2.4273	27 28 4.5	4.497	14	18 46 28.94	2.3713	27 56 37.6	3.221
15	16 52 38.41	2.4289	27 32 29.5	4.336	15	18 48 51.10	2.3673	27 53 19.8	3.371
16	16 55 4.19	2.4304	27 36 44.8	4.173	16	18 51 13.02	2.3633	27 49 53.1	3.520
17	16 57 30.06	2.4318	27 40 50.3	4.011	17	18 53 34.70	2.3592	27 46 17.4	3.669
18	16 59 56.01	2.4331	27 44 46.1	3.849	18	18 55 56.12	2.3549	27 42 32.8	3.817
19	17 2 22.03	2.4342	27 48 32.2	3.687	19	18 58 17.29	2.3506	27 38 39.4	3.963
20	17 4 48.12	2.4353	27 52 8.5	3.523	20	19 0 38.19	2.3461	27 34 37.2	4.109
21	17 7 14.27	2.4363	27 55 35.0	3.360	21	19 2 58.82	2.3416	27 30 26.3	4.254
22	17 9 40.47	2.4371	27 58 51.7	3.197	22	19 5 19.18	2.3371	27 26 6.7	4.399
23	17 12 6.72	2.4378	28 1 58.6	3.033	23	19 7 39.27	2.3324	27 21 38.4	4.542
24	17 14 33.01	2.4384	S. 28 4 55.7	2.869	24	19 9 59.07	2.3276	S. 27 17 1.6	4.684

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 17.			
	h m s	s	° ′ ″	″
0	19 9 59.07	2.3276	S. 27 17 1.6	4.684
1	19 12 18.58	2.3227	27 12 16.3	4.826
2	19 14 37.80	2.3178	27 7 22.5	4.966
3	19 16 56.72	2.3128	27 2 20.4	5.105
4	19 19 15.34	2.3078	26 57 9.9	5.244
5	19 21 33.66	2.3027	26 51 51.1	5.381
6	19 23 51.67	2.2975	26 46 24.2	5.517
7	19 26 9.36	2.2923	26 40 49.1	5.653
8	19 28 26.74	2.2870	26 35 5.9	5.787
9	19 30 43.80	2.2816	26 29 14.7	5.919
10	19 33 0.53	2.2762	26 23 15.6	6.051
11	19 35 16.94	2.2707	26 17 8.6	6.182
12	19 37 33.02	2.2652	26 10 53.7	6.312
13	19 39 48.76	2.2596	26 4 31.1	6.441
14	19 42 4.17	2.2540	25 58 0.8	6.568
15	19 44 19.24	2.2483	25 51 22.9	6.694
16	19 46 33.97	2.2426	25 44 37.5	6.820
17	19 48 48.35	2.2368	25 37 44.5	6.945
18	19 51 2.39	2.2311	25 30 44.1	7.068
19	19 53 16.08	2.2253	25 23 36.4	7.189
20	19 55 29.42	2.2195	25 16 21.4	7.310
21	19 57 42.42	2.2137	25 8 59.2	7.430
22	19 59 55.06	2.2077	25 1 29.8	7.548
23	20 2 7.34	2.2017	S. 24 53 53.4	7.666
	FRIDAY 18.			
0	20 4 19.26	2.1957	S. 24 46 9.9	7.782
1	20 6 30.82	2.1897	24 38 19.5	7.897
2	20 8 42.03	2.1838	24 30 22.2	8.011
3	20 10 52.88	2.1778	24 22 18.2	8.123
4	20 13 3.36	2.1717	24 14 7.5	8.234
5	20 15 13.48	2.1657	24 5 50.1	8.345
6	20 17 23.24	2.1597	23 57 26.1	8.454
7	20 19 32.64	2.1536	23 48 55.6	8.562
8	20 21 41.67	2.1475	23 40 18.6	8.669
9	20 23 50.34	2.1414	23 31 35.3	8.774
10	20 25 58.64	2.1353	23 22 45.7	8.878
11	20 28 6.58	2.1292	23 13 49.9	8.982
12	20 30 14.15	2.1232	23 4 47.9	9.083
13	20 32 21.36	2.1172	22 55 39.9	9.184
14	20 34 28.21	2.1111	22 46 25.8	9.284
15	20 36 34.69	2.1050	22 37 5.8	9.382
16	20 38 40.81	2.0990	22 27 40.0	9.478
17	20 40 46.57	2.0930	22 18 8.4	9.575
18	20 42 51.97	2.0870	22 8 31.0	9.670
19	20 44 57.01	2.0810	21 58 48.0	9.763
20	20 47 1.69	2.0750	21 48 59.4	9.856
21	20 49 6.01	2.0690	21 39 5.3	9.947
22	20 51 9.97	2.0631	21 29 5.7	10.037
23	20 53 13.58	2.0572	21 19 0.8	10.126
24	20 55 16.83	2.0512	S. 21 8 50.6	10.214

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 19.			
	h m s	s	° ′ ″	″
0	20 55 16.83	2.0512	S. 21 8 50.6	10.214
1	20 57 19.72	2.0453	20 58 35.1	10.301
2	20 59 22.27	2.0395	20 48 14.5	10.386
3	21 1 24.46	2.0337	20 37 48.8	10.470
4	21 3 26.31	2.0279	20 27 18.1	10.553
5	21 5 27.81	2.0222	20 16 42.4	10.636
6	21 7 28.97	2.0164	20 6 1.8	10.717
7	21 9 29.78	2.0107	19 55 16.4	10.797
8	21 11 30.25	2.0050	19 44 26.2	10.875
9	21 13 30.38	1.9993	19 33 31.4	10.952
10	21 15 30.17	1.9937	19 22 31.9	11.029
11	21 17 29.63	1.9882	19 11 27.9	11.104
12	21 19 28.76	1.9827	19 0 19.4	11.178
13	21 21 27.56	1.9772	18 49 6.5	11.252
14	21 23 26.03	1.9717	18 37 49.2	11.323
15	21 25 24.17	1.9663	18 26 27.7	11.394
16	21 27 21.99	1.9611	18 15 1.9	11.464
17	21 29 19.50	1.9558	18 3 32.0	11.533
18	21 31 16.69	1.9505	17 51 58.0	11.601
19	21 33 13.56	1.9453	17 40 19.9	11.667
20	21 35 10.12	1.9401	17 28 37.9	11.732
21	21 37 6.37	1.9350	17 16 52.0	11.797
22	21 39 2.32	1.9300	17 5 2.2	11.86[illegible]
23	21 40 57.97	1.9250	S. 16 53 8.6	11.924
	SUNDAY 20.			
0	21 42 53.32	1.9200	S. 16 41 11.3	11.986
1	21 44 48.37	1.9151	16 29 10.3	12.046
2	21 46 43.13	1.9102	16 17 5.8	12.105
3	21 48 37.60	1.9054	16 4 57.7	12.163
4	21 50 31.78	1.9007	15 52 46.2	12.221
5	21 52 25.68	1.8960	15 40 31.2	12.278
6	21 54 19.30	1.8914	15 28 12.8	12.333
7	21 56 12.65	1.8868	15 15 51.2	12.388
8	21 58 5.72	1.8822	15 3 26.3	12.442
9	21 59 58.52	1.8777	14 50 58.2	12.494
10	22 1 51.05	1.8733	14 38 27.0	12.545
11	22 3 43.32	1.8691	14 25 52.8	12.596
12	22 5 35.34	1.8648	14 13 15.5	12.646
13	22 7 27.10	1.8606	14 0 35.3	12.694
14	22 9 18.61	1.8564	13 47 52.2	12.742
15	22 11 9.87	1.8522	13 35 6.2	12.790
16	22 13 0.88	1.8482	13 22 17.4	12.836
17	22 14 51.65	1.8443	13 9 25.9	12.881
18	22 16 42.19	1.8404	12 56 31.7	12.925
19	22 18 32.50	1.8366	12 43 34.9	12.968
20	22 20 22.58	1.8328	12 30 35.5	13.011
21	22 22 12.43	1.8290	12 17 33.6	13.052
22	22 24 2.06	1.8253	12 4 29.2	13.093
23	22 25 51.47	1.8217	11 51 22.4	13.133
24	22 27 40.67	1.8182	S. 11 38 13.2	13.172

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 21.					WEDNESDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	22 27 40.67	1.8182	S.11 38 13.2	13.172	0	23 52 13.24	1.7322	S. 0 35 55.9	14.142
1	22 29 29.66	1.8148	11 25 1.7	13.211	1	23 53 57.17	1.7322	0 21 47.3	14.145
2	22 31 18.45	1.8114	11 11 47.9	13.248	2	23 55 41.11	1.7323	S. 0 7 38.5	14.148
3	22 33 7.03	1.8081	10 58 31.9	13.284	3	23 57 25.05	1.7324	N. 0 6 30.5	14.150
4	22 34 55.42	1.8048	10 45 13.8	13.320	4	23 59 9.00	1.7327	0 20 39.5	14.150
5	22 36 43.61	1.8017	10 31 53.5	13.355	5	0 0 52.97	1.7331	0 34 48.5	14.150
6	22 38 31.62	1.7986	10 18 31.2	13.388	6	0 2 36.97	1.7335	0 48 57.5	14.150
7	22 40 19.44	1.7955	10 5 6.9	13.422	7	0 4 20.99	1.7339	1 3 6.5	14.150
8	22 42 7.08	1.7925	9 51 40.6	13.455	8	0 6 5.04	1.7345	1 17 15.5	14.148
9	22 43 54.54	1.7896	9 38 12.3	13.487	9	0 7 49.13	1.7352	1 31 24.3	14.145
10	22 45 41.83	1.7868	9 24 42.2	13.517	10	0 9 33.26	1.7358	1 45 32.9	14.142
11	22 47 28.95	1.7840	9 11 10.3	13.547	11	0 11 17.43	1.7366	1 59 41.4	14.139
12	22 49 15.91	1.7813	8 57 36.6	13.576	12	0 13 1.65	1.7375	2 13 49.6	14.134
13	22 51 2.71	1.7787	8 44 1.2	13.604	13	0 14 45.93	1.7384	2 27 57.5	14.129
14	22 52 49.35	1.7761	8 30 24.1	13.632	14	0 16 30.26	1.7394	2 42 5.1	14.123
15	22 54 35.84	1.7736	8 16 45.3	13.659	15	0 18 14.66	1.7405	2 56 12.3	14.117
16	22 56 22.18	1.7712	8 3 5.0	13.685	16	0 19 59.12	1.7417	3 10 19.2	14.111
17	22 58 8.38	1.7688	7 49 23.1	13.711	17	0 21 43.66	1.7430	3 24 25.6	14.103
18	22 59 54.44	1.7665	7 35 39.7	13.735	18	0 23 28.28	1.7443	3 38 31.5	14.094
19	23 1 40.36	1.7643	7 21 54.9	13.759	19	0 25 12.98	1.7457	3 52 36.9	14.085
20	23 3 26.15	1.7622	7 8 8.6	13.782	20	0 26 57.77	1.7472	4 6 41.7	14.076
21	23 5 11.82	1.7602	6 54 21.0	13.804	21	0 28 42.65	1.7488	4 20 46.0	14.066
22	23 6 57.37	1.7582	6 40 32.1	13.826	22	0 30 27.62	1.7504	4 34 49.6	14.054
23	23 8 42.80	1.7562	S. 6 26 41.9	13.847	23	0 32 12.70	1.7522	N. 4 48 52.5	14.042
	TUESDAY 22.					THURSDAY 24.			
0	23 10 28.11	1.7543	S. 6 12 50.4	13.867	0	0 33 57.88	1.7540	N. 5 2 54.6	14.029
1	23 12 13.31	1.7525	5 58 57.8	13.887	1	0 35 43.18	1.7559	5 16 56.0	14.017
2	23 13 58.41	1.7509	5 45 4.0	13.906	2	0 37 28.59	1.7578	5 30 56.6	14.003
3	23 15 43.42	1.7493	5 31 9.1	13.923	3	0 39 14.12	1.7598	5 44 56.3	13.988
4	23 17 28.33	1.7477	5 17 13.2	13.941	4	0 40 59.77	1.7620	5 58 55.2	13.973
5	23 19 13.14	1.7462	5 3 16.2	13.957	5	0 42 45.56	1.7642	6 12 53.1	13.957
6	23 20 57.87	1.7447	4 49 18.3	13.973	6	0 44 31.48	1.7665	6 26 50.0	13.940
7	23 22 42.51	1.7434	4 35 19.4	13.989	7	0 46 17.54	1.7689	6 40 45.9	13.922
8	23 24 27.08	1.7422	4 21 19.6	14.003	8	0 48 3.75	1.7714	6 54 40.7	13.904
9	23 26 11.57	1.7410	4 7 19.0	14.017	9	0 49 50.11	1.7739	7 8 34.4	13.886
10	23 27 56.00	1.7399	3 53 17.6	14.030	10	0 51 36.62	1.7765	7 22 27.0	13.867
11	23 29 40.36	1.7389	3 39 15.4	14.042	11	0 53 23.29	1.7792	7 36 18.4	13.846
12	23 31 24.67	1.7380	3 25 12.5	14.054	12	0 55 10.12	1.7819	7 50 8.5	13.824
13	23 33 8.92	1.7370	3 11 8.9	14.065	13	0 56 57.12	1.7848	8 3 57.3	13.802
14	23 34 53.11	1.7362	2 57 4.7	14.076	14	0 58 44.30	1.7877	8 17 44.8	13.780
15	23 36 37.26	1.7355	2 42 59.8	14.086	15	1 0 31.65	1.7907	8 31 30.9	13.757
16	23 38 21.37	1.7348	2 28 54.4	14.094	16	1 2 19.19	1.7938	8 45 15.6	13.733
17	23 40 5.44	1.7342	2 14 48.5	14.102	17	1 4 6.91	1.7970	8 58 58.9	13.708
18	23 41 49.47	1.7337	2 0 42.1	14.110	18	1 5 54.83	1.8003	9 12 40.6	13.683
19	23 43 33.48	1.7332	1 46 35.3	14.117	19	1 7 42.95	1.8037	9 26 20.8	13.657
20	23 45 17.46	1.7328	1 32 28.0	14.124	20	1 9 31.27	1.8070	9 39 59.4	13.629
21	23 47 1.42	1.7326	1 18 20.4	14.129	21	1 11 19.79	1.8105	9 53 36.3	13.601
22	23 48 45.37	1.7324	1 4 12.5	14.134	22	1 13 8.53	1.8142	10 7 11.5	13.572
23	23 50 29.31	1.7323	0 50 4.3	14.138	23	1 14 57.49	1.8178	10 20 45.0	13.542
24	23 52 13.24	1.7322	S. 0 35 55.9	14.142	24	1 16 46.67	1.8215	N.10 34 16.6	13.512

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 25.					SUNDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	1 16 46.67	1.8215	N.10 34 16.6	13.512	0	2 50 1.48	2.0923	N.20 30 6.2	10.907
1	1 18 36.07	1.8253	10 47 46.4	13.481	1	2 52 7.24	2.0997	20 40 58.1	10.824
2	1 20 25.71	1.8292	11 1 14.3	13.448	2	2 54 13.44	2.1071	20 51 45.1	10.741
3	1 22 15.58	1.8332	11 14 40.2	13.416	3	2 56 20.09	2.1146	21 2 27.0	10.656
4	1 24 5.70	1.8373	11 28 4.2	13.382	4	2 58 27.19	2.1220	21 13 3.8	10.569
5	1 25 56.06	1.8414	11 41 26.1	13.347	5	3 0 34.73	2.1295	21 23 35.3	10.480
6	1 27 46.67	1.8457	11 54 45.9	13.312	6	3 2 42.73	2.1372	21 34 1.4	10.391
7	1 29 37.54	1.8500	12 8 3.5	13.275	7	3 4 51.19	2.1448	21 44 22.2	10.301
8	1 31 28.67	1.8544	12 21 18.9	13.238	8	3 7 0.10	2.1524	21 54 37.5	10.208
9	1 33 20.07	1.8589	12 34 32.1	13.201	9	3 9 9.48	2.1602	22 4 47.2	10.114
10	1 35 11.74	1.8634	12 47 43.0	13.162	10	3 11 19.32	2.1679	22 14 51.2	10.019
11	1 37 3.68	1.8680	13 0 51.5	13.121	11	3 13 29.63	2.1757	22 24 49.5	9.922
12	1 38 55.90	1.8728	13 13 57.5	13.079	12	3 15 40.40	2.1835	22 34 41.9	9.824
13	1 40 48.41	1.8776	13 27 1.0	13.038	13	3 17 51.65	2.1914	22 44 28.4	9.725
14	1 42 41.21	1.8824	13 40 2.0	12.996	14	3 20 3.37	2.1993	22 54 8.9	9.624
15	1 44 34.30	1.8873	13 53 0.5	12.952	15	3 22 15.56	2.2072	23 3 43.3	9.522
16	1 46 27.69	1.8924	14 5 56.3	12.907	16	3 24 28.23	2.2152	23 13 11.5	9.418
17	1 48 21.39	1.8975	14 18 49.3	12.861	17	3 26 41.38	2.2231	23 22 33.4	9.312
18	1 50 15.39	1.9027	14 31 39.6	12.815	18	3 28 55.00	2.2311	23 31 48.9	9.205
19	1 52 9.71	1.9080	14 44 27.1	12.767	19	3 31 9.11	2.2392	23 40 58.0	9.097
20	1 54 4.35	1.9133	14 57 11.7	12.718	20	3 33 23.70	2.2472	23 50 0.5	8.986
21	1 55 59.31	1.9187	15 9 53.3	12.669	21	3 35 38.77	2.2552	23 58 56.3	8.874
22	1 57 54.59	1.9242	15 22 32.0	12.619	22	3 37 54.33	2.2633	24 7 45.4	8.762
23	1 59 50.21	1.9298	N.15 35 7.6	12.567	23	3 40 10.37	2.2714	N.24 16 27.7	8.647
	SATURDAY 26.					MONDAY 28.			
0	2 1 46.17	1.9355	N.15 47 40.0	12.513	0	3 42 26.89	2.2795	N.24 25 3.0	8.530
1	2 3 42.47	1.9412	16 0 9.2	12.460	1	3 44 43.91	2.2876	24 33 31.3	8.412
2	2 5 39.11	1.9469	16 12 35.2	12.406	2	3 47 1.41	2.2957	24 41 52.5	8.293
3	2 7 36.10	1.9528	16 24 57.9	12.350	3	3 49 19.39	2.3038	24 50 6.5	8.172
4	2 9 33.45	1.9588	16 37 17.2	12.293	4	3 51 37.86	2.3119	24 58 13.1	8.048
5	2 11 31.15	1.9648	16 49 33.1	12.235	5	3 53 56.82	2.3200	25 6 12.3	7.925
6	2 13 29.22	1.9709	17 1 45.4	12.175	6	3 56 16.26	2.3280	25 14 4.1	7.800
7	2 15 27.66	1.9771	17 13 54.1	12.115	7	3 58 36.18	2.3361	25 21 48.3	7.673
8	2 17 26.47	1.9833	17 25 59.2	12.054	8	4 0 56.59	2.3442	25 29 24.8	7.543
9	2 19 25.66	1.9897	17 38 0.6	11.992	9	4 3 17.48	2.3522	25 36 53.5	7.412
10	2 21 25.23	1.9960	17 49 58.2	11.928	10	4 5 38.85	2.3602	25 44 14.3	7.280
11	2 23 25.18	2.0024	18 1 52.0	11.863	11	4 8 0.70	2.3682	25 51 27.1	7.147
12	2 25 25.52	2.0090	18 13 41.8	11.797	12	4 10 23.03	2.3762	25 58 31.9	7.012
13	2 27 26.26	2.0156	18 25 27.6	11.729	13	4 12 45.84	2.3841	26 5 28.5	6.875
14	2 29 27.39	2.0223	18 37 9.3	11.661	14	4 15 9.12	2.3919	26 12 16.9	6.737
15	2 31 28.93	2.0290	18 48 46.9	11.591	15	4 17 32.87	2.3998	26 18 56.9	6.596
16	2 33 30.87	2.0358	19 0 20.2	11.520	16	4 19 57.09	2.4076	26 25 28.4	6.453
17	2 35 33.22	2.0427	19 11 49.3	11.448	17	4 22 21.78	2.4153	26 31 51.3	6.310
18	2 37 35.99	2.0496	19 23 14.0	11.375	18	4 24 46.93	2.4231	26 38 5.6	6.166
19	2 39 39.17	2.0566	19 34 34.3	11.300	19	4 27 12.55	2.4308	26 44 11.2	6.019
20	2 41 42.78	2.0637	19 45 50.0	11.223	20	4 29 38.62	2.4383	26 50 7.9	5.871
21	2 43 46.81	2.0708	19 57 1.1	11.147	21	4 32 5.14	2.4458	26 55 55.7	5.722
22	2 45 51.27	2.0779	20 8 7.6	11.068	22	4 34 32.12	2.4533	27 1 34.5	5.571
23	2 47 56.16	2.0851	20 19 9.3	10.988	23	4 36 59.54	2.4608	27 7 4.2	5.418
24	2 50 1.48	2.0923	N.20 30 6.2	10.907	24	4 39 27.41	2.4682	N.27 12 24.6	5.263

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 29.			
	h m s	s	° ′ ″	″
0	4 39 27.41	2.4682	N.27 12 24.6	5.263
1	4 41 55.72	2.4754	27 17 35.7	5.107
2	4 44 24.46	2.4826	27 22 37.4	4.950
3	4 46 53.63	2.4897	27 27 29.7	4.792
4	4 49 23.22	2.4967	27 32 12.4	4.631
5	4 51 53.23	2.5036	27 36 45.4	4.468
6	4 54 23.65	2.5104	27 41 8.6	4.305
7	4 56 54.48	2.5172	27 45 22.0	4.141
8	4 59 25.71	2.5238	27 49 25.5	3.974
9	5 1 57.34	2.5304	27 53 18.9	3.807
10	5 4 29.36	2.5368	27 57 2.3	3.638
11	5 7 1.76	2.5431	28 0 35.5	3.468
12	5 9 34.53	2.5493	28 3 58.5	3.297
13	5 12 7.68	2.5555	28 7 11.1	3.123
14	5 14 41.19	2.5614	28 10 13.3	2.950
15	5 17 15.05	2.5672	28 13 5.1	2.775
16	5 19 49.25	2.5729	28 15 46.3	2.598
17	5 22 23.80	2.5786	28 18 16.8	2.419
18	5 24 58.68	2.5840	28 20 36.6	2.240
19	5 27 33.88	2.5892	28 22 45.6	2.060
20	5 30 9.39	2.5944	28 24 43.8	1.878
21	5 32 45.21	2.5994	28 26 31.0	1.696
22	5 35 21.32	2.6043	28 28 7.3	1.513
23	5 37 57.72	2.6091	N.28 29 32.5	1.328
	WEDNESDAY 30.			
0	5 40 34.41	2.6137	N.28 30 46.6	1.142
1	5 43 11.37	2.6181	28 31 49.5	0.955
2	5 45 48.58	2.6223	28 32 41.2	0.767
3	5 48 26.04	2.6264	28 33 21.6	0.579
4	5 51 3.75	2.6304	28 33 50.7	0.390
5	5 53 41.69	2.6342	28 34 8.4	0.199
6	5 56 19.85	2.6378	28 34 14.6	+0.007
7	5 58 58.22	2.6412	28 34 9.3	−0.184
8	6 1 36.79	2.6445	28 33 52.5	0.377
9	6 4 15.55	2.6476	28 33 24.1	0.569
10	6 6 54.50	2.6505	28 32 44.2	0.762
11	6 9 33.62	2.6533	28 31 52.6	0.958
12	6 12 12.90	2.6558	28 30 49.2	1.154
13	6 14 52.33	2.6582	28 29 34.1	1.349
14	6 17 31.89	2.6605	28 28 7.3	1.545
15	6 20 11.58	2.6625	28 26 28.7	1.742
16	6 22 51.39	2.6644	28 24 38.3	1.939
17	6 25 31.31	2.6661	28 22 36.0	2.137
18	6 28 11.32	2.6675	28 20 21.9	2.334
19	6 30 51.41	2.6688	28 17 55.9	2.532
20	6 33 31.58	2.6700	28 15 18.0	2.731
21	6 36 11.81	2.6709	28 12 28.2	2.928
22	6 38 52.09	2.6717	28 9 26.6	3.127
23	6 41 32.41	2.6723	28 6 13.0	3.326
24	6 44 12.77	2.6727	N.28 2 47.5	3.524

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 31.			
	h m s	s	° ′ ″	″
0	6 44 12.77	2.6727	N.28 2 47.5	3.524
1	6 46 53.14	2.6729	27 59 10.1	3.723
2	6 49 33.52	2.6730	27 55 20.7	3.922
3	6 52 13.90	2.6728	27 51 19.5	4.119
4	6 54 54.26	2.6725	27 47 6.4	4.317
5	6 57 34.60	2.6720	27 42 41.4	4.516
6	7 0 14.90	2.6713	27 38 4.5	4.714
7	7 2 55.16	2.6705	27 33 15.7	4.912
8	7 5 35.36	2.6695	27 28 15.1	5.108
9	7 8 15.50	2.6683	27 23 2.7	5.305
10	7 10 55.56	2.6670	27 17 38.5	5.501
11	7 13 35.54	2.6655	27 12 2.6	5.697
12	7 16 15.42	2.6637	27 6 14.9	5.893
13	7 18 55.19	2.6618	27 0 15.5	6.088
14	7 21 34.84	2.6598	26 54 4.4	6.282
15	7 24 14.37	2.6577	26 47 41.7	6.475
16	7 26 53.76	2.6553	26 41 7.4	6.668
17	7 29 33.01	2.6528	26 34 21.5	6.860
18	7 32 12.10	2.6502	26 27 24.2	7.051
19	7 34 51.03	2.6474	26 20 15.4	7.242
20	7 37 29.79	2.6444	26 12 55.2	7.431
21	7 40 8.36	2.6413	26 5 23.7	7.619
22	7 42 46.75	2.6382	25 57 40.9	7.807
23	7 45 24.94	2.6348	N.25 49 46.8	7.994
	FRIDAY, AUGUST 1.			
0	7 48 2.93	2.6313	N.25 41 41.6	8.179

PHASES OF THE MOON.

			d	h	m
●	New Moon . . .	July	3	17	6.2
☽	First Quarter		10	9	37.4
○	Full Moon		17	18	6.4
☾	Last Quarter		25	21	58.7

			d	h
☾	Perigee	July	6	11.8
☾	Apogee		22	7.5

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Fri.	1	8 44 8.44	9.723	N.18 7 14.1	-37.52	15 47.42	66.64	6 10.32	0.134
Sat.	2	8 48 1.48	9.697	17 52 4.7	38.25	15 47.54	66.55	6 6.80	0.159
SUN.	3	8 51 53.91	9.671	17 36 37.9	38.98	15 47.67	66.46	6 2.68	0.184
Mon.	4	8 55 45.72	9.645	17 20 53.8	-39.69	15 47.81	66.37	5 57.96	0.210
Tues.	5	8 59 36.92	9.620	17 4 52.8	40.39	15 47.95	66.28	5 52.62	0.235
Wed.	6	9 3 27.50	9.594	16 48 35.3	41.07	15 48.10	66.19	5 46.66	0.261
Thur.	7	9 7 17.47	9.569	16 32 1.5	-41.74	15 48.25	66.11	5 40.09	0.286
Fri.	8	9 11 6.83	9.544	16 15 11.8	42.40	15 48.40	66.02	5 32.91	0.312
Sat.	9	9 14 55.59	9.519	15 58 6.6	43.04	15 48.55	65.94	5 25.13	0.337
SUN.	10	9 18 43.74	9.494	15 40 46.1	-43.67	15 48.71	65.86	5 16.75	0.362
Mon.	11	9 22 31.29	9.469	15 23 10.7	44.28	15 48.88	65.78	5 7.77	0.386
Tues.	12	9 26 18.26	9.445	15 5 20.6	44.88	15 49.05	65.70	4 58.21	0.410
Wed.	13	9 30 4.66	9.421	14 47 16.1	-45.48	15 49.22	65.62	4 48.08	0.434
Thur.	14	9 33 50.49	9.398	14 28 57.6	46.06	15 49.40	65.54	4 37.38	0.457
Fri.	15	9 37 35.77	9.375	14 10 25.3	46.63	15 49.58	65.46	4 26.14	0.480
Sat.	16	9 41 20.51	9.353	13 51 39.5	-47.19	15 49.76	65.38	4 14.36	0.502
SUN.	17	9 45 4.73	9.332	13 32 40.5	47.73	15 49.94	65.31	4 2.06	0.523
Mon.	18	9 48 48.43	9.311	13 13 28.6	48.26	15 50.12	65.23	3 49.25	0.544
Tues.	19	9 52 31.64	9.290	12 54 4.1	-48.78	15 50.30	65.16	3 35.94	0.565
Wed.	20	9 56 14.36	9.270	12 34 27.3	49.28	15 50.49	65.09	3 22.14	0.585
Thur.	21	9 59 56.61	9.251	12 14 38.6	49.78	15 50.68	65.02	3 7.87	0.604
Fri.	22	10 3 38.41	9.232	11 54 38.1	-50.26	15 50.87	64.95	2 53.15	0.622
Sat.	23	10 7 19.77	9.214	11 34 26.2	50.73	15 51.07	64.88	2 38.00	0.640
SUN.	24	10 11 0.70	9.197	11 14 3.2	51.18	15 51.27	64.82	2 22.42	0.658
Mon.	25	10 14 41.22	9.180	10 53 29.4	-51.62	15 51.47	64.76	2 6.43	0.675
Tues.	26	10 18 21.34	9.164	10 32 45.1	52.06	15 51.67	64.70	1 50.03	0.691
Wed.	27	10 22 1.08	9.148	10 11 50.6	52.48	15 51.88	64.64	1 33.26	0.706
Thur.	28	10 25 40.45	9.133	9 50 46.2	-52.88	15 52.09	64.58	1 16.13	0.721
Fri.	29	10 29 19.47	9.118	9 29 32.4	53.26	15 52.30	64.53	0 58.64	0.736
Sat.	30	10 32 58.14	9.104	9 8 9.5	53.63	15 52.52	64.48	0 40.81	0.750
SUN.	31	10 36 36.48	9.091	8 46 37.8	54.00	15 52.74	64.43	0 22.65	0.764
Mon.	32	10 40 14.50	9.078	N. 8 24 57.6	-54.35	15 52.97	64.38	0 4.17	0.777

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting $0^s.19$ from the sidereal time.

The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Fri.	1	8 44 7.44	9.723	N.18 7 18.0	−37.52	6 10.33	0.134	8 37 57.11
Sat.	2	8 48 0.48	9.698	17 52 8.6	38.25	6 6.82	0.159	8 41 53.67
SUN.	3	8 51 52.93	9.672	17 36 41.8	38.98	6 2.70	0.184	8 45 50.22
Mon.	4	8 55 44.76	9.646	17 20 57.7	−39.69	5 57.98	0.210	8 49 46.78
Tues.	5	8 59 35.98	9.621	17 4 56.7	40.39	5 52.64	0.235	8 53 43.34
Wed.	6	9 3 26.58	9.595	16 48 39.2	41.07	5 46.69	0.261	8 57 39.90
Thur.	7	9 7 16.57	9.570	16 32 5.4	−41.74	5 40.12	0.286	9 1 36.45
Fri.	8	9 11 5.95	9.545	16 15 15.7	42.40	5 32.94	0.312	9 5 33.01
Sat.	9	9 14 54.73	9.520	15 58 10.5	43.04	5 25.16	0.337	9 9 29.56
SUN.	10	9 18 42.90	9.495	15 40 50.0	−43.67	5 16.78	0.362	9 13 26.12
Mon.	11	9 22 30.48	9.470	15 23 14.5	44.29	5 7.80	0.386	9 17 22.68
Tues.	12	9 26 17.48	9.446	15 5 24.3	44.89	4 58.24	0.410	9 21 19.23
Wed.	13	9 30 3.91	9.423	14 47 19.7	−45.48	4 48.11	0.434	9 25 15.79
Thur.	14	9 33 49.77	9.400	14 29 1.1	46.06	4 37.42	0.457	9 29 12.34
Fri.	15	9 37 35.08	9.377	14 10 28.7	46.63	4 26.18	0.480	9 33 8.90
Sat.	16	9 41 19.85	9.355	13 51 42.8	−47.19	4 14.40	0.502	9 37 5.46
SUN.	17	9 45 4.10	9.333	13 32 43.7	47.73	4 2.09	0.523	9 41 2.01
Mon.	18	9 48 47.84	9.312	13 13 31.7	48.26	3 49.27	0.544	9 44 58.57
Tues.	19	9 52 31.08	9.292	12 54 7.0	−48.78	3 35.96	0.565	9 48 55.12
Wed.	20	9 56 13.84	9.272	12 34 30.1	49.29	3 22.17	0.585	9 52 51.68
Thur.	21	9 59 56.13	9.253	12 14 41.2	49.79	3 7.90	0.604	9 56 48.23
Fri.	22	10 3 37.97	9.234	11 54 40.5	−50.27	2 53.18	0.622	10 0 44.79
Sat.	23	10 7 19.37	9.216	11 34 28.4	50.74	2 38.02	0.640	10 4 41.34
SUN.	24	10 11 0.34	9.199	11 14 5.2	51.19	2 22.44	0.658	10 8 37.90
Mon.	25	10 14 40.90	9.182	10 53 31.2	−51.63	2 6.45	0.675	10 12 34.45
Tues.	26	10 18 21.06	9.166	10 32 46.7	52.07	1 50.05	0.691	10 16 31.01
Wed.	27	10 22 0.84	9.150	10 11 52.0	52.49	1 33.28	0.706	10 20 27.56
Thur.	28	10 25 40.26	9.135	9 50 47.4	−52.89	1 16.14	0.721	10 24 24.12
Fri.	29	10 29 19.32	9.120	9 29 33.3	53.28	0 58.65	0.736	10 28 20.67
Sat.	30	10 32 58.04	9.106	9 8 10.1	53.65	0 40.82	0.750	10 32 17.22
SUN.	31	10 36 36.43	9.093	8 46 38.0	54.01	0 22.65	0.764	10 36 13.78
Mon.	32	10 40 14.50	9.080	N. 8 24 57.4	−54.36	0 4.16	0.777	10 40 10.33

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign − prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 Hour, $+9^{s}.8565$. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S True Longitude. λ			THE SUN'S True Longitude. λ′		THE SUN'S Diff. for 1 Hour.	THE SUN'S Latitude.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.		
		°	′	″	′	″	″	″			h	m	s
1	213	128	36	27.0	35	55.6	143.60	+0.25	0.006 4069	−23.3	15	19	31.83
2	214	129	33	53.8	33	22.2	143.63	0.16	0.006 3500	24.3	15	15	35.92
3	215	130	31	21.5	30	49.8	143.67	+0.05	0.006 2906	25.3	15	11	40.01
4	216	131	28	50.1	28	18.2	143.71	−0.07	0.006 2287	−26.3	15	7	44.10
5	217	132	26	19.6	25	47.5	143.75	0.20	0.006 1645	27.2	15	3	48.19
6	218	133	23	49.8	23	17.6	143.78	0.34	0.006 0980	28.1	14	59	52.28
7	219	134	21	20.8	20	48.5	143.81	−0.47	0.006 0293	−29.0	14	55	56.37
8	220	135	18	52.6	18	20.1	143.84	0.60	0.005 9586	29.8	14	52	0.46
9	221	136	16	25.1	15	52.5	143.87	0.70	0.005 8861	30.5	14	48	4.55
10	222	137	13	58.5	13	25.7	143.91	−0.76	0.005 8120	−31.2	14	44	8.64
11	223	138	11	32.7	10	59.8	143.95	0.79	0.005 7364	31.8	14	40	12.73
12	224	139	9	7.9	8	34.8	143.99	0.80	0.005 6593	32.4	14	36	16.82
13	225	140	6	44.1	6	10.8	144.03	−0.78	0.005 5810	−32.9	14	32	20.91
14	226	141	4	21.3	3	47.9	144.07	0.74	0.005 5015	33.4	14	28	25.00
15	227	142	1	59.6	1	26.1	144.12	0.67	0.005 4210	33.9	14	24	29.09
16	228	142	59	39.1	59	5.5	144.17	−0.57	0.005 3394	−34.3	14	20	33.18
17	229	143	57	20.0	56	46.2	144.23	0.45	0.005 2567	34.7	14	16	37.27
18	230	144	55	2.2	54	28.2	144.29	0.32	0.005 1730	35.1	14	12	41.36
19	231	145	52	45.8	52	11.7	144.35	−0.20	0.005 0883	−35.5	14	8	45.45
20	232	146	50	30.9	49	56.7	144.41	−0.08	0.005 0026	35.9	14	4	49.54
21	233	147	48	17.6	47	43.3	144.48	+0.04	0.004 9158	36.4	14	0	53.63
22	234	148	46	6.0	45	31.5	144.55	+0.15	0.004 8279	−36.9	13	56	57.72
23	235	149	43	56.0	43	21.4	144.62	0.24	0.004 7388	37.4	13	53	1.81
24	236	150	41	47.7	41	13.0	144.69	0.31	0.004 6485	37.9	13	49	5.90
25	237	151	39	41.2	39	6.3	144.76	+0.36	0.004 5569	−38.5	13	45	10.00
26	238	152	37	36.5	37	1.5	144.84	0.37	0.004 4639	39.1	13	41	14.09
27	239	153	35	33.6	34	58.5	144.91	0.35	0.004 3693	39.7	13	37	18.18
28	240	154	33	32.6	32	57.3	144.99	+0.31	0.004 2731	−40.4	13	33	22.27
29	241	155	31	33.4	30	58.0	145.06	0.24	0.004 1752	41.2	13	29	26.36
30	242	156	29	36.0	29	0.5	145.14	+0.13	0.004 0755	41.9	13	25	30.45
31	243	157	27	40.3	27	4.7	145.21	0.00	0.003 9740	42.7	13	21	34.54
32	244	158	25	46.3	25	10.5	145.28	−0.13	0.003 8706	−43.5	13	17	38.63

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ′ are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour, −9ˢ.8296. (Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	16 22.6	16 27.5	60 0.35	+1.628	60 18.26	+1.350	☌	. .	28.3
2	16 31.4	16 34.2	60 32.59	1.033	60 42.96	+0.691	0 8.4	2.45	29.3
3	16 35.9	16 36.4	60 49.11	+0.333	60 50.94	−0.025	1 5.2	2.30	1.0
4	16 35.7	16 34.0	60 48.54	−0.372	60 42.10	−0.696	1 58.5	2.16	2.0
5	16 31.2	16 27.6	60 31.96	0.987	60 18.55	1.241	2 49.1	2.07	3.0
6	16 23.2	16 18.1	60 2.35	1.451	59 43.90	1.615	3 38.4	2.05	4.0
7	16 12.7	16 6.9	59 23.77	−1.733	59 2.47	−1.809	4 27.7	2.08	5.0
8	16 0.9	15 54.8	58 40.50	1.848	58 18.26	1.854	5 18.3	2.15	6.0
9	15 48.8	15 42.8	57 56.13	1.831	57 34.42	1.784	6 10.9	2.24	7.0
10	15 37.1	15 31.6	57 13.38	−1.720	56 53.20	−1.642	7 5.6	2.32	8.0
11	15 26.4	15 21.4	56 33.99	1.557	56 15.83	1.468	8 1.7	2.35	9.0
12	15 16.8	15 12.5	55 58.79	1.372	55 42.89	1.277	8 57.7	2.31	10.0
13	15 8.4	15 4.7	55 28.13	−1.183	55 14.49	−1.090	9 51.8	2.20	11.0
14	15 1.3	14 58.2	55 1.96	0.998	54 50.52	0.907	10 42.9	2.05	12.0
15	14 55.4	14 52.8	54 40.17	0.816	54 30.93	0.723	11 30.4	1.91	13.0
16	14 50.6	14 48.7	54 22.81	−0.629	54 15.82	−0.533	12 14.4	1.77	14.0
17	14 47.1	14 45.9	54 10.02	0.432	54 5.48	0.324	12 55.7	1.68	15.0
18	14 45.0	14 44.6	54 2.26	−0.211	54 0.46	−0.087	13 35.2	1.62	16.0
19	14 44.5	14 44.9	54 0.20	+0.045	54 1.57	+0.185	14 13.8	1.61	17.0
20	14 45.7	14 47.0	54 4.68	0.334	54 9.64	0.494	14 52.8	1.64	18.0
21	14 48.9	14 51.4	54 16.56	0.662	54 25.54	0.837	15 33.0	1.72	19.0
22	14 54.4	14 58.0	54 36.67	+1.018	54 50.00	+1.204	16 15.8	1.85	20.0
23	15 2.3	15 7.1	55 5.57	1.390	55 23.36	1.574	17 2.2	2.02	21.0
24	15 12.6	15 18.6	55 43.34	1.754	56 5.40	1.921	17 53.0	2.21	22.0
25	15 25.1	15 32.1	56 29.39	+2.074	56 55.08	+2.204	18 48.4	2.40	23.0
26	15 39.5	15 47.2	57 22.16	2.307	57 50.26	2.371	19 47.7	2.52	24.0
27	15 55.0	16 2.8	58 18.91	2.396	58 47.58	2.373	20 48.8	2.55	25.0
28	16 10.4	16 17.7	59 15.65	+2.296	59 42.43	+2.160	21 49.6	2.49	26.0
29	16 24.5	16 30.5	60 7.22	1.964	60 29.32	1.710	22 48.0	2.37	27.0
30	16 35.6	16 39.6	60 48.03	1.400	61 2.74	1.047	23 43.4	2.25	28.0
31	16 42.4	16 43.9	61 12.99	+0.658	61 18.44	+0.248	☌	. .	29.0
32	16 44.0	16 42.8	61 18.90	−0.171	61 14.39	−0.578	0 36.2	2.16	0.6

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 1.					SUNDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	7 48 2.93	2.6313	N.25 41 41.6	8.179	0	9 48 38.43	2.3765	N.16 3 14.7	15.237
1	7 50 40.70	2.6277	25 33 25.3	8.364	1	9 51 0.85	2.3708	15 47 57.5	15.337
2	7 53 18.25	2.6239	25 24 57.9	8.547	2	9 53 22.93	2.3652	15 32 34.3	15.435
3	7 55 55.57	2.6200	25 16 19.6	8.729	3	9 55 44.67	2.3596	15 17 5.3	15.530
4	7 58 32.65	2.6160	25 7 30.4	8.910	4	9 58 6.08	2.3540	15 1 30.7	15.623
5	8 1 9.49	2.6119	24 58 30.4	9.090	5	10 0 27.15	2.3485	14 45 50.5	15.715
6	8 3 46.08	2.6077	24 49 19.6	9.268	6	10 2 47.90	2.3430	14 30 4.9	15.804
7	8 6 22.41	2.6033	24 39 58.2	9.445	7	10 5 8.31	2.3375	14 14 14.0	15.891
8	8 8 58.48	2.5989	24 30 26.2	9.622	8	10 7 28.40	2.3321	13 58 18.0	15.976
9	8 11 34.28	2.5943	24 20 43.7	9.796	9	10 9 48.16	2.3268	13 42 16.9	16.059
10	8 14 9.80	2.5897	24 10 50.7	9.968	10	10 12 7.61	2.3215	13 26 10.9	16.139
11	8 16 45.04	2.5850	24 0 47.4	10.141	11	10 14 26.74	2.3163	13 10 0.2	16.217
12	8 19 20.00	2.5802	23 50 33.8	10.311	12	10 16 45.56	2.3111	12 53 44.8	16.294
13	8 21 54.66	2.5753	23 40 10.1	10.479	13	10 19 4.07	2.3059	12 37 24.9	16.368
14	8 24 29.03	2.5703	23 29 36.3	10.646	14	10 21 22.27	2.3008	12 21 0.6	16.441
15	8 27 3.09	2.5652	23 18 52.6	10.811	15	10 23 40.17	2.2958	12 4 32.0	16.511
16	8 29 36.85	2.5600	23 7 59.0	10.975	16	10 25 57.77	2.2909	11 47 59.3	16.578
17	8 32 10.29	2.5548	22 56 55.6	11.137	17	10 28 15.08	2.2860	11 31 22.6	16.644
18	8 34 43.42	2.5495	22 45 42.5	11.298	18	10 30 32.09	2.2812	11 14 42.0	16.708
19	8 37 16.23	2.5441	22 34 19.8	11.457	19	10 32 48.82	2.2765	10 57 57.6	16.770
20	8 39 48.71	2.5387	22 22 47.7	11.614	20	10 35 5.27	2.2718	10 41 9.6	16.830
21	8 42 20.87	2.5332	22 11 6.1	11.770	21	10 37 21.44	2.2672	10 24 18.0	16.888
22	8 44 52.70	2.5277	21 59 15.3	11.923	22	10 39 37.33	2.2626	10 7 23.1	16.943
23	8 47 24.19	2.5221	N.21 47 15.4	12.074	23	10 41 52.95	2.2582	N. 9 50 24.9	16.996
	SATURDAY 2.					MONDAY 4.			
0	8 49 55.35	2.5164	N.21 35 6.4	12.224	0	10 44 8.31	2.2538	N. 9 33 23.6	17.047
1	8 52 26.16	2.5108	21 22 48.5	12.372	1	10 46 23.40	2.2494	9 16 19.3	17.097
2	8 54 56.64	2.5051	21 10 21.7	12.519	2	10 48 38.24	2.2452	8 59 12.0	17.144
3	8 57 26.77	2.4993	20 57 46.2	12.663	3	10 50 52.83	2.2411	8 42 2.0	17.189
4	8 59 56.56	2.4936	20 45 2.1	12.806	4	10 53 7.17	2.2369	8 24 49.3	17.232
5	9 2 26.00	2.4877	20 32 9.5	12.946	5	10 55 21.26	2.2329	8 7 34.1	17.273
6	9 4 55.09	2.4818	20 19 8.6	13.084	6	10 57 35.12	2.2290	7 50 16.5	17.312
7	9 7 23.82	2.4760	20 5 59.4	13.222	7	10 59 48.74	2.2252	7 32 56.6	17.349
8	9 9 52.21	2.4702	19 52 42.0	13.357	8	11 2 2.14	2.2214	7 15 34.6	17.383
9	9 12 20.24	2.4643	19 39 16.6	13.489	9	11 4 15.31	2.2178	6 58 10.6	17.417
10	9 14 47.93	2.4585	19 25 43.3	13.620	10	11 6 28.27	2.2142	6 40 44.6	17.448
11	9 17 15.26	2.4525	19 12 2.2	13.748	11	11 8 41.01	2.2106	6 23 16.8	17.477
12	9 19 42.23	2.4466	18 58 13.5	13.875	12	11 10 53.54	2.2072	6 5 47.3	17.505
13	9 22 8.85	2.4407	18 44 17.2	14.001	13	11 13 5.87	2.2038	5 48 16.2	17.530
14	9 24 35.11	2.4348	18 30 13.4	14.124	14	11 15 18.00	2.2005	5 30 43.7	17.553
15	9 27 1.03	2.4290	18 16 2.3	14.244	15	11 17 29.93	2.1973	5 13 9.9	17.573
16	9 29 26.59	2.4230	18 1 44.1	14.363	16	11 19 41.68	2.1942	4 55 34.9	17.593
17	9 31 51.79	2.4172	17 47 18.8	14.479	17	11 21 53.24	2.1912	4 37 58.7	17.611
18	9 34 16.65	2.4113	17 32 46.6	14.593	18	11 24 4.62	2.1883	4 20 21.6	17.626
19	9 36 41.15	2.4054	17 18 7.6	14.706	19	11 26 15.84	2.1856	4 2 43.6	17.639
20	9 39 5.30	2.3996	17 3 21.9	14.817	20	11 28 26.89	2.1828	3 45 4.9	17.651
21	9 41 29.10	2.3938	16 48 29.6	14.925	21	11 30 37.77	2.1801	3 27 25.5	17.661
22	9 43 52.56	2.3881	16 33 30.9	15.031	22	11 32 48.50	2.1776	3 9 45.6	17.669
23	9 46 15.67	2.3823	16 18 25.9	15.135	23	11 34 59.08	2.1751	2 52 5.2	17.675
24	9 48 38.43	2.3765	N.16 3 14.7	15.237	24	11 37 9.51	2.1727	N. 2 34 24.6	17.678

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 5.					THURSDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	11 37 9.51	2.1727	N. 2 34 24.6	17.678	0	13 20 23.09	2.1612	S. 11 6 10.2	15.895
1	11 39 19.80	2.1704	2 16 43.8	17.681	1	13 22 32.82	2.1630	11 22 1.7	15.820
2	11 41 29.96	2.1682	1 59 2.9	17.682	2	13 24 42.65	2.1648	11 37 48.6	15.744
3	11 43 39.99	2.1661	1 41 22.0	17.681	3	13 26 52.59	2.1667	11 53 31.0	15.667
4	11 45 49.89	2.1640	1 23 41.2	17.677	4	13 29 2.65	2.1686	12 9 8.7	15.588
5	11 47 59.67	2.1621	1 6 0.7	17.672	5	13 31 12.82	2.1706	12 24 41.6	15.508
6	11 50 9.34	2.1603	0 48 20.6	17.665	6	13 33 23.12	2.1727	12 40 9.7	15.427
7	11 52 18.90	2.1585	0 30 40.9	17.657	7	13 35 33.54	2.1748	12 55 32.9	15.344
8	11 54 28.36	2.1568	N. 0 13 1.7	17.647	8	13 37 44.10	2.1771	13 10 51.0	15.260
9	11 56 37.72	2.1552	S. 0 4 36.7	17.634	9	13 39 54.79	2.1793	13 26 4.0	15.174
10	11 58 46.99	2.1538	0 22 14.4	17.621	10	13 42 5.62	2.1817	13 41 11.9	15.088
11	12 0 56.18	2.1524	0 39 51.2	17.605	11	13 44 16.59	2.1840	13 56 14.6	15.000
12	12 3 5.28	2.1510	0 57 27.0	17.587	12	13 46 27.70	2.1864	14 11 11.9	14.910
13	12 5 14.30	2.1498	1 15 1.7	17.568	13	13 48 38.96	2.1890	14 26 3.8	14.820
14	12 7 23.26	2.1487	1 32 35.2	17.548	14	13 50 50.38	2.1916	14 40 50.3	14.728
15	12 9 32.15	2.1477	1 50 7.4	17.526	15	13 53 1.95	2.1942	14 55 31.2	14.635
16	12 11 40.98	2.1467	2 7 38.3	17.502	16	13 55 13.68	2.1969	15 10 6.5	14.540
17	12 13 49.75	2.1458	2 25 7.7	17.476	17	13 57 25.58	2.1997	15 24 36.0	14.444
18	12 15 58.48	2.1451	2 42 35.5	17.448	18	13 59 37.64	2.2023	15 38 59.8	14.347
19	12 18 7.16	2.1444	3 0 1.5	17.419	19	14 1 49.86	2.2052	15 53 17.7	14.248
20	12 20 15.81	2.1438	3 17 25.7	17.388	20	14 4 2.26	2.2081	16 7 29.7	14.149
21	12 22 24.42	2.1432	3 34 48.1	17.357	21	14 6 14.83	2.2109	16 21 35.6	14.048
22	12 24 33.00	2.1428	3 52 8.5	17.323	22	14 8 27.57	2.2138	16 35 35.4	13.946
23	12 26 41.56	2.1426	S. 4 9 26.8	17.287	23	14 10 40.49	2.2169	S. 16 49 29.1	13.843
	WEDNESDAY 6.					FRIDAY 8.			
0	12 28 50.11	2.1423	S. 4 26 42.9	17.249	0	14 12 53.60	2.2200	S. 17 3 16.6	13.738
1	12 30 58.64	2.1422	4 43 56.7	17.210	1	14 15 6.89	2.2230	17 16 57.7	13.633
2	12 33 7.17	2.1421	5 1 8.1	17.169	2	14 17 20.36	2.2262	17 30 32.5	13.526
3	12 35 15.69	2.1420	5 18 17.0	17.127	3	14 19 34.03	2.2293	17 44 0.8	13.418
4	12 37 24.21	2.1422	5 35 23.4	17.084	4	14 21 47.88	2.2325	17 57 22.6	13.308
5	12 39 32.75	2.1424	5 52 27.1	17.039	5	14 24 1.93	2.2357	18 10 37.8	13.198
6	12 41 41.30	2.1427	6 9 28.1	16.992	6	14 26 16.17	2.2390	18 23 46.4	13.087
7	12 43 49.87	2.1430	6 26 26.2	16.943	7	14 28 30.61	2.2423	18 36 48.2	12.973
8	12 45 58.46	2.1434	6 43 21.3	16.893	8	14 30 45.25	2.2457	18 49 43.2	12.859
9	12 48 7.08	2.1439	7 0 13.4	16.842	9	14 33 0.09	2.2490	19 2 31.3	12.744
10	12 50 15.73	2.1445	7 17 2.4	16.790	10	14 35 15.13	2.2523	19 15 12.5	12.628
11	12 52 24.42	2.1452	7 33 48.2	16.736	11	14 37 30.37	2.2557	19 27 46.7	12.511
12	12 54 33.16	2.1460	7 50 30.7	16.680	12	14 39 45.81	2.2591	19 40 13.8	12.393
13	12 56 41.94	2.1468	8 7 9.8	16.622	13	14 42 1.46	2.2626	19 52 33.8	12.273
14	12 58 50.78	2.1477	8 23 45.4	16.563	14	14 44 17.32	2.2660	20 4 46.5	12.152
15	13 0 59.67	2.1487	8 40 17.4	16.503	15	14 46 33.38	2.2694	20 16 52.0	12.030
16	13 3 8.63	2.1498	8 56 45.7	16.441	16	14 48 49.65	2.2728	20 28 50.1	11.907
17	13 5 17.65	2.1510	9 13 10.3	16.378	17	14 51 6.12	2.2763	20 40 40.8	11.783
18	13 7 26.75	2.1523	9 29 31.1	16.313	18	14 53 22.81	2.2799	20 52 24.1	11.658
19	13 9 35.92	2.1536	9 45 47.9	16.247	19	14 55 39.71	2.2834	21 3 59.8	11.532
20	13 11 45.18	2.1550	10 2 0.7	16.180	20	14 57 56.82	2.2868	21 15 27.9	11.405
21	13 13 54.52	2.1564	10 18 9.4	16.111	21	15 0 14.13	2.2903	21 26 48.4	11.277
22	13 16 3.95	2.1579	10 34 14.0	16.040	22	15 2 31.66	2.2938	21 38 1.2	11.148
23	13 18 13.47	2.1595	10 50 14.3	15.968	23	15 4 49.39	2.2973	21 49 6.2	11.018
24	13 20 23.09	2.1612	S. 11 6 10.2	15.895	24	15 7 7.34	2.3009	S. 22 0 3.3	10.886

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 9.					MONDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	15 7 7.34	2.3009	S. 22 0 3.3	10.886	0	17 0 58.40	2.4202	S. 27 55 33.7	3.681
1	15 9 25.50	2.3043	22 10 52.5	10.754	1	17 3 23.63	2.4208	27 59 9.7	3.519
2	15 11 43.86	2.3078	22 21 33.8	10.621	2	17 5 48.89	2.4213	28 2 36.0	3.357
3	15 14 2.44	2.3113	22 32 7.0	10.487	3	17 8 14.18	2.4217	28 5 52.5	3.194
4	15 16 21.22	2.3147	22 42 32.2	10.352	4	17 10 39.50	2.4221	28 8 59.3	3.032
5	15 18 40.21	2.3182	22 52 49.2	10.216	5	17 13 4.83	2.4223	28 11 56.4	2.870
6	15 20 59.41	2.3217	23 2 58.1	10.079	6	17 15 30.17	2.4224	28 14 43.7	2.708
7	15 23 18.81	2.3250	23 12 58.7	9.941	7	17 17 55.52	2.4224	28 17 21.3	2.545
8	15 25 38.41	2.3284	23 22 51.0	9.802	8	17 20 20.86	2.4223	28 19 49.1	2.383
9	15 27 58.22	2.3317	23 32 34.9	9.662	9	17 22 46.19	2.4221	28 22 7.2	2.220
10	15 30 18.22	2.3351	23 42 10.4	9.521	10	17 25 11.51	2.4218	28 24 15.5	2.058
11	15 32 38.43	2.3384	23 51 37.4	9.380	11	17 27 36.81	2.4213	28 26 14.1	1.896
12	15 34 58.83	2.3417	24 0 56.0	9.238	12	17 30 2.07	2.4207	28 28 3.0	1.733
13	15 37 19.43	2.3449	24 10 6.0	9.095	13	17 32 27.30	2.4201	28 29 42.1	1.570
14	15 39 40.22	2.3481	24 19 7.4	8.951	14	17 34 52.48	2.4193	28 31 11.4	1.408
15	15 42 1.20	2.3513	24 28 0.1	8.806	15	17 37 17.62	2.4185	28 32 31.1	1.247
16	15 44 22.37	2.3544	24 36 44.1	8.660	16	17 39 42.70	2.4175	28 33 41.0	1.085
17	15 46 43.73	2.3575	24 45 19.3	8.514	17	17 42 7.72	2.4164	28 34 41.3	0.923
18	15 49 5.27	2.3605	24 53 45.8	8.367	18	17 44 32.67	2.4152	28 35 31.8	0.762
19	15 51 26.99	2.3635	25 2 3.4	8.219	19	17 46 57.54	2.4138	28 36 12.7	0.602
20	15 53 48.89	2.3664	25 10 12.1	8.070	20	17 49 22.33	2.4124	28 36 44.0	0.441
21	15 56 10.96	2.3692	25 18 11.8	7.921	21	17 51 47.03	2.4108	28 37 5.6	0.280
22	15 58 33.20	2.3721	25 26 2.6	7.771	22	17 54 11.63	2.4092	28 37 17.6	−0.120
23	16 0 55.61	2.3749	S. 25 33 44.3	7.620	23	17 56 36.13	2.4075	S. 28 37 20.0	+0.040
	SUNDAY 10.					TUESDAY 12.			
0	16 3 18.19	2.3777	S. 25 41 17.0	7.469	0	17 59 0.53	2.4056	S. 28 37 12.8	0.200
1	16 5 40 93	2.3803	25 48 40.6	7.317	1	18 1 24.80	2.4036	28 36 56.0	0.359
2	16 8 3.83	2.3829	25 55 55.0	7.163	2	18 3 48.96	2.4015	28 36 29.7	0.518
3	16 10 26.88	2.3854	26 3 0.2	7.010	3	18 6 12.98	2.3993	28 35 53.9	0.675
4	16 12 50.08	2.3878	26 9 56.2	6.856	4	18 8 36.87	2.3970	28 35 8.7	0.833
5	16 15 13.42	2.3902	26 16 42.9	6.702	5	18 11 0.62	2.3946	28 34 14.0	0.991
6	16 17 36.91	2.3926	26 23 20.4	6.547	6	18 13 24.22	2.3920	28 33 9.8	1.148
7	16 20 0.53	2.3948	26 29 48.5	6.391	7	18 15 47.66	2.3894	28 31 56.2	1.304
8	16 22 24.29	2.3970	26 36 7.3	6.235	8	18 18 10.95	2.3867	28 30 33.3	1.460
9	16 24 48.17	2.3991	26 42 16.7	6.078	9	18 20 34.07	2.3839	28 29 1.0	1.615
10	16 27 12.18	2.4012	26 48 16.6	5.920	10	18 22 57.02	2.3810	28 27 19.5	1.769
11	16 29 36.31	2.4031	26 54 7.1	5.763	11	18 25 19.79	2.3779	28 25 28.7	1.924
12	16 32 0.55	2.4049	26 59 48.2	5.606	12	18 27 42.37	2.3748	28 23 28.6	2.077
13	16 34 24.90	2.4067	27 5 19.8	5.447	13	18 30 4.76	2.3716	28 21 19.4	2.230
14	16 36 49.36	2.4084	27 10 41.8	5.288	14	18 32 26.96	2.3682	28 19 1.0	2.382
15	16 39 13.91	2.4100	27 15 54.3	5.128	15	18 34 48.95	2.3648	28 16 33.5	2.534
16	16 41 38.56	2.4115	27 20 57.2	4.968	16	18 37 10.74	2.3613	28 13 56.9	2.685
17	16 44 3.29	2.4129	27 25 50.5	4.808	17	18 39 32.31	2.3577	28 11 11.3	2.835
18	16 46 28.11	2.4142	27 30 34.2	4.648	18	18 41 53.67	2.3541	28 8 16.7	2.984
19	16 48 53.00	2.4154	27 35 8.3	4.487	19	18 44 14.80	2.3503	28 5 13.2	3.133
20	16 51 17.96	2.4166	27 39 32.7	4.327	20	18 46 35.70	2.3464	28 2 0.8	3.281
21	16 53 42.99	2.4176	27 43 47.5	4.166	21	18 48 56.37	2.3425	27 58 39.5	3.428
22	16 56 8.07	2.4185	27 47 52.6	4.004	22	18 51 16.80	2.3384	27 55 9.4	3.574
23	16 58 33.21	2.4194	27 51 48.0	3.843	23	18 53 36.98	2.3343	27 51 30.6	3.720
24	17 0 58.40	2.4202	S. 27 55 33.7	3.681	24	18 55 56.92	2.3302	S. 27 47 43.0	3.865

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 13.					FRIDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	18 55 56.92	2.3302	S. 27 47 43.0	3.865	0	20 41 54.58	2.0733	S. 22 13 42.8	9.647
1	18 58 16.60	2.3258	27 43 46.8	4.008	1	20 43 58.81	2.0676	22 4 1.2	9.740
2	19 0 36.02	2.3214	27 39 42.0	4.152	2	20 46 2.69	2.0619	21 54 14.0	9.832
3	19 2 55.17	2.3170	27 35 28.6	4.294	3	20 48 6.24	2.0562	21 44 21.3	9.924
4	19 5 14.06	2.3126	27 31 6.7	4.436	4	20 50 9.44	2.0506	21 34 23.1	10.015
5	19 7 32.68	2.3080	27 26 36.3	4.576	5	20 52 12.31	2.0450	21 24 19.5	10.104
6	19 9 51.02	2.3033	27 21 57.6	4.715	6	20 54 14.84	2.0394	21 14 10.6	10.192
7	19 12 9.08	2.2986	27 17 10.5	4.854	7	20 56 17.04	2.0338	21 3 56.4	10.280
8	19 14 26.85	2.2938	27 12 15.1	4.992	8	20 58 18.90	2.0282	20 53 37.0	10.366
9	19 16 44.34	2.2891	27 7 11.5	5.128	9	21 0 20.43	2.0227	20 43 12.5	10.451
10	19 19 1.54	2.2842	27 1 59.7	5.264	10	21 2 21.63	2.0172	20 32 42.9	10.534
11	19 21 18.44	2.2792	26 56 39.8	5.399	11	21 4 22.50	2.0117	20 22 8.4	10.617
12	19 23 35.04	2.2742	26 51 11.8	5.533	12	21 6 23.04	2.0062	20 11 28.9	10.699
13	19 25 51.34	2.2691	26 45 35.8	5.666	13	21 8 23.25	2.0008	20 0 44.5	10.780
14	19 28 7.33	2.2640	26 39 51.9	5.797	14	21 10 23.14	1.9955	19 49 55.3	10.859
15	19 30 23.02	2.2588	26 34 0.1	5.928	15	21 12 22.71	1.9902	19 39 1.4	10.937
16	19 32 38.39	2.2536	26 28 0.5	6.058	16	21 14 21.96	1.9848	19 28 2.8	11.015
17	19 34 53.45	2.2484	26 21 53.1	6.187	17	21 16 20.89	1.9796	19 16 59.6	11.091
18	19 37 8.20	2.2431	26 15 38.0	6.316	18	21 18 19.51	1.9743	19 5 51.9	11.166
19	19 39 22.62	2.2377	26 9 15.2	6.443	19	21 20 17.81	1.9691	18 54 39.7	11.241
20	19 41 36.72	2.2323	26 2 44.9	6.568	20	21 22 15.80	1.9639	18 43 23.0	11.314
21	19 43 50.50	2.2269	25 56 7.1	6.693	21	21 24 13.48	1.9588	18 32 2.0	11.386
22	19 46 3.95	2.2214	25 49 21.8	6.817	22	21 26 10.85	1.9537	18 20 36.7	11.457
23	19 48 17.07	2.2159	S. 25 42 29.1	6.939	23	21 28 7.92	1.9487	S. 18 9 7.2	11.527
	THURSDAY 14.					SATURDAY 16.			
0	19 50 29.86	2.2104	S. 25 35 29.1	7.061	0	21 30 4.69	1.9437	S. 17 57 33.5	11.596
1	19 52 42.32	2.2048	25 28 21.8	7.181	1	21 32 1.16	1.9387	17 45 55.7	11.663
2	19 54 54.44	2.1993	25 21 7.4	7.300	2	21 33 57.33	1.9338	17 34 13.9	11.730
3	19 57 6.23	2.1937	25 13 45.8	7.418	3	21 35 53.21	1.9289	17 22 28.1	11.796
4	19 59 17.68	2.1880	25 6 17.2	7.536	4	21 37 48.80	1.9242	17 10 38.4	11.861
5	20 1 28.79	2.1823	24 58 41.5	7.652	5	21 39 44.11	1.9193	16 58 44.8	11.925
6	20 3 39.56	2.1767	24 50 58.9	7.767	6	21 41 39.12	1.9145	16 46 47.4	11.988
7	20 5 49.99	2.1710	24 43 9.5	7.881	7	21 43 33.85	1.9099	16 34 46.2	12.050
8	20 8 0.08	2.1653	24 35 13.2	7.994	8	21 45 28.31	1.9053	16 22 41.4	12.110
9	20 10 9.83	2.1596	24 27 10.2	8.105	9	21 47 22.49	1.9007	16 10 33.0	12.170
10	20 12 19.23	2.1538	24 19 0.6	8.216	10	21 49 16.39	1.8962	15 58 21.0	12.229
11	20 14 28.29	2.1481	24 10 44.3	8.326	11	21 51 10.02	1.8916	15 46 5.5	12.287
12	20 16 37.00	2.1423	24 2 21.5	8.434	12	21 53 3.38	1.8872	15 33 46.6	12.343
13	20 18 45.37	2.1366	23 53 52.2	8.541	13	21 54 56.48	1.8828	15 21 24.3	12.400
14	20 20 53.39	2.1308	23 45 16.6	8.647	14	21 56 49.32	1.8785	15 8 58.6	12.455
15	20 23 1.06	2.1250	23 36 34.6	8.752	15	21 58 41.90	1.8742	14 56 29.7	12.508
16	20 25 8.39	2.1193	23 27 46.3	8.856	16	22 0 34.22	1.8699	14 43 57.6	12.561
17	20 27 15.37	2.1135	23 18 51.9	8.958	17	22 2 26.29	1.8658	14 31 22.4	12.613
18	20 29 22.01	2.1078	23 9 51.3	9.061	18	22 4 18.12	1.8617	14 18 44.1	12.664
19	20 31 28.30	2.1020	23 0 44.6	9.161	19	22 6 9.70	1.8577	14 6 2.7	12.715
20	20 33 34.25	2.0962	22 51 32.0	9.260	20	22 8 1.04	1.8537	13 53 18.3	12.764
21	20 35 39.85	2.0904	22 42 13.4	9.358	21	22 9 52.14	1.8498	13 40 31.0	12.812
22	20 37 45.10	2.0847	22 32 49.0	9.455	22	22 11 43.01	1.8458	13 27 40.8	12.859
23	20 39 50.01	2.0790	22 23 18.8	9.552	23	22 13 33.64	1.8420	13 14 47.9	12.905
24	20 41 54.58	2.0733	S. 22 13 42.8	9.647	24	22 15 24.05	1.8382	S. 13 1 52.2	12.951

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 17.					TUESDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	22 15 24.05	1.8382	S. 13 1 52.2	12.951	0	23 40 29.06	1.7322	S. 2 3 55.7	14.156
1	22 17 14.23	1.8345	12 48 53.8	12.996	1	23 42 12.97	1.7316	1 49 46.1	14.163
2	22 19 4.19	1.8309	12 35 52.7	13.040	2	23 43 56.85	1.7311	1 35 36.2	14.168
3	22 20 53.94	1.8273	12 22 49.0	13.082	3	23 45 40.70	1.7307	1 21 26.0	14.173
4	22 22 43.47	1.8238	12 9 42.8	13.124	4	23 47 24.53	1.7303	1 7 15.5	14.177
5	22 24 32.79	1.8203	11 56 34.1	13.165	5	23 49 8.34	1.7300	0 53 4.8	14.180
6	22 26 21.91	1.8169	11 43 23.0	13.205	6	23 50 52.13	1.7298	0 38 53.9	14.183
7	22 28 10.82	1.8135	11 30 9.5	13.245	7	23 52 35.91	1.7297	0 24 42.8	14.185
8	22 29 59.53	1.8102	11 16 53.6	13.284	8	23 54 19.69	1.7296	S. 0 10 31.7	14.185
9	22 31 48.05	1.8070	11 3 35.4	13.321	9	23 56 3.46	1.7296	N. 0 3 39.4	14.186
10	22 33 36.37	1.8038	10 50 15.0	13.357	10	23 57 47.24	1.7297	0 17 50.6	14.186
11	22 35 24.51	1.8007	10 36 52.5	13.393	11	23 59 31.02	1.7298	0 32 1.7	14.185
12	22 37 12.46	1.7977	10 23 27.9	13.428	12	0 1 14.81	1.7300	0 46 12.8	14.183
13	22 39 0.23	1.7947	10 10 1.2	13.462	13	0 2 58.62	1.7302	1 0 23.7	14.181
14	22 40 47.83	1.7918	9 56 32.4	13.496	14	0 4 42.44	1.7306	1 14 34.5	14.178
15	22 42 35.25	1.7890	9 43 1.7	13.528	15	0 6 26.29	1.7311	1 28 45.1	14.174
16	22 44 22.51	1.7862	9 29 29.0	13.560	16	0 8 10.17	1.7316	1 42 55.4	14.169
17	22 46 9.60	1.7835	9 15 54.5	13.591	17	0 9 54.08	1.7321	1 57 5.4	14.164
18	22 47 56.53	1.7808	9 2 18.1	13.621	18	0 11 38.02	1.7327	2 11 15.1	14.159
19	22 49 43.30	1.7782	8 48 40.0	13.650	19	0 13 22.01	1.7335	2 25 24.5	14.152
20	22 51 29.91	1.7757	8 35 0.1	13.678	20	0 15 6.04	1.7342	2 39 33.4	14.144
21	22 53 16.38	1.7732	8 21 18.6	13.706	21	0 16 50.11	1.7350	2 53 41.8	14.137
22	22 55 2.70	1.7708	8 7 35.4	13.732	22	0 18 34.24	1.7360	3 7 49.8	14.128
23	22 56 48.88	1.7686	S. 7 53 50.7	13.758	23	0 20 18.43	1.7370	N. 3 21 57.2	14.118
	MONDAY 18.					WEDNESDAY 20.			
0	22 58 34.93	1.7663	S. 7 40 4.4	13.784	0	0 22 2.68	1.7381	N. 3 36 4.0	14.108
1	23 0 20.84	1.7641	7 26 16.6	13.808	1	0 23 47.00	1.7392	3 50 10.2	14.097
2	23 2 6.62	1.7619	7 12 27.5	13.831	2	0 25 31.39	1.7404	4 4 15.7	14.086
3	23 3 52.27	1.7598	6 58 36.9	13.854	3	0 27 15.85	1.7417	4 18 20.5	14.073
4	23 5 37.80	1.7579	6 44 45.0	13.876	4	0 29 0.39	1.7431	4 32 24.5	14.060
5	23 7 23.22	1.7560	6 30 51.8	13.897	5	0 30 45.02	1.7445	4 46 27.7	14.047
6	23 9 8.52	1.7541	6 16 57.3	13.917	6	0 32 29.73	1.7460	5 0 30.1	14.033
7	23 10 53.71	1.7523	6 3 1.7	13.937	7	0 34 14.54	1.7476	5 14 31.6	14.017
8	23 12 38.79	1.7505	5 49 4.9	13.956	8	0 35 59.44	1.7493	5 28 32.1	14.001
9	23 14 23.77	1.7489	5 35 7.0	13.974	9	0 37 44.45	1.7510	5 42 31.7	13.984
10	23 16 8.66	1.7473	5 21 8.0	13.992	10	0 39 29.56	1.7528	5 56 30.2	13.967
11	23 17 53.45	1.7458	5 7 8.0	14.008	11	0 41 14.78	1.7546	6 10 27.7	13.949
12	23 19 38.15	1.7443	4 53 7.0	14.024	12	0 43 0.11	1.7565	6 24 24.1	13.930
13	23 21 22.76	1.7429	4 39 5.1	14.039	13	0 44 45.56	1.7586	6 38 19.3	13.910
14	23 23 7.30	1.7416	4 25 2.3	14.053	14	0 46 31.14	1.7607	6 52 13.3	13.890
15	23 24 51.75	1.7403	4 10 58.7	14.067	15	0 48 16.84	1.7628	7 6 6.1	13.869
16	23 26 36.13	1.7392	3 56 54.2	14.081	16	0 50 2.67	1.7650	7 19 57.6	13.847
17	23 28 20.45	1.7381	3 42 49.0	14.093	17	0 51 48.64	1.7673	7 33 47.8	13.825
18	23 30 4.70	1.7369	3 28 43.1	14.103	18	0 53 34.75	1.7697	7 47 36.6	13.801
19	23 31 48.88	1.7359	3 14 36.6	14.113	19	0 55 21.01	1.7722	8 1 23.9	13.777
20	23 33 33.01	1.7351	3 0 29.5	14.123	20	0 57 7.42	1.7747	8 15 9.8	13.752
21	23 35 17.09	1.7343	2 46 21.8	14.133	21	0 58 53.98	1.7773	8 28 54.2	13.727
22	23 37 1.12	1.7335	2 32 13.5	14.142	22	1 0 40.69	1.7800	8 42 37.0	13.700
23	23 38 45.11	1.7328	2 18 4.8	14.148	23	1 2 27.57	1.7827	8 56 18.2	13.673
24	23 40 29.06	1.7322	S. 2 3 55.7	14.156	24	1 4 14.62	1.7856	N. 9 9 57.8	13.646

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 21.					SATURDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	1 4 14.62	1.7856	N. 9 9 57.8	13.646	0	2 34 34.94	2.0056	N.19 16 44.8	11.281
1	1 6 1.84	1.7884	9 23 35.7	13.617	1	2 36 35.46	2.0118	19 27 59.4	11.207
2	1 7 49.23	1.7914	9 37 11.8	13.587	2	2 38 36.35	2.0180	19 39 9.6	11.132
3	1 9 36.81	1.7945	9 50 46.1	13.557	3	2 40 37.62	2.0243	19 50 15.3	11.057
4	1 11 24.57	1.7976	10 4 18.6	13.526	4	2 42 39.27	2.0307	20 1 16.4	10.979
5	1 13 12.52	1.8008	10 17 49.2	13.494	5	2 44 41.31	2.0372	20 12 12.8	10.901
6	1 15 0.66	1.8040	10 31 17.9	13.462	6	2 46 43.74	2.0437	20 23 4.5	10.822
7	1 16 49.00	1.8073	10 44 44.6	13.428	7	2 48 46.56	2.0502	20 33 51.4	10.741
8	1 18 37.54	1.8107	10 58 9.3	13.393	8	2 50 49.77	2.0568	20 44 33.4	10.659
9	1 20 26.29	1.8142	11 11 31.8	13.358	9	2 52 53.38	2.0635	20 55 10.5	10.577
10	1 22 15.25	1.8178	11 24 52.3	13.323	10	2 54 57.39	2.0702	21 5 42.6	10.493
11	1 24 4.43	1.8215	11 38 10.6	13.286	11	2 57 1.81	2.0770	21 16 9.6	10.407
12	1 25 53.83	1.8252	11 51 26.6	13.248	12	2 59 6.63	2.0838	21 26 31.4	10.320
13	1 27 43.45	1.8289	12 4 40.4	13.210	13	3 1 11.86	2.0906	21 36 48.0	10.232
14	1 29 33.30	1.8328	12 17 51.8	13.170	14	3 3 17.50	2.0975	21 46 59.3	10.143
15	1 31 23.38	1.8367	12 31 0.8	13.130	15	3 5 23.56	2.1044	21 57 5.2	10.053
16	1 33 13.70	1.8407	12 44 7.4	13.089	16	3 7 30.03	2.1113	22 7 5.6	9.961
17	1 35 4.27	1.8448	12 57 11.5	13.047	17	3 9 36.92	2.1184	22 17 0.5	9.868
18	1 36 55.08	1.8489	13 10 13.1	13.005	18	3 11 44.24	2.1255	22 26 49.8	9.775
19	1 38 46.14	1.8531	13 23 12.1	12.961	19	3 13 51.98	2.1325	22 36 33.4	9.679
20	1 40 37.45	1.8574	13 36 8.4	12.917	20	3 16 0.14	2.1396	22 46 11.3	9.582
21	1 42 29.03	1.8618	13 49 2.1	12.872	21	3 18 8.73	2.1467	22 55 43.3	9.484
22	1 44 20.87	1.8662	14 1 53.0	12.825	22	3 20 17.75	2.1539	23 5 9.4	9.385
23	1 46 12.97	1.8707	N.14 14 41.1	12.778	23	3 22 27.20	2.1612	N.23 14 29.5	9.285
	FRIDAY 22.					SUNDAY 24.			
0	1 48 5.35	1.8753	N.14 27 26.4	12.730	0	3 24 37.09	2.1684	N.23 23 43.6	9.183
1	1 49 58.00	1.8799	14 40 8.7	12.681	1	3 26 47.41	2.1757	23 32 51.5	9.079
2	1 51 50.94	1.8847	14 52 48.1	12.631	2	3 28 58.17	2.1830	23 41 53.1	8.974
3	1 53 44.16	1.8894	15 5 24.4	12.579	3	3 31 9.37	2.1903	23 50 48.4	8.868
4	1 55 37.67	1.8943	15 17 57.6	12.528	4	3 33 21.00	2.1976	23 59 37.3	8.761
5	1 57 31.47	1.8992	15 30 27.8	12.476	5	3 35 33.08	2.2049	24 8 19.7	8.652
6	1 59 25.57	1.9042	15 42 54.7	12.422	6	3 37 45.59	2.2123	24 16 55.5	8.542
7	2 1 19.97	1.9093	15 55 18.4	12.367	7	3 39 58.55	2.2197	24 25 24.7	8.431
8	2 3 14.68	1.9144	16 7 38.7	12.311	8	3 42 11.95	2.2270	24 33 47.2	8.318
9	2 5 9.70	1.9197	16 19 55.7	12.255	9	3 44 25.79	2.2344	24 42 2.8	8.203
10	2 7 5.04	1.9249	16 32 9.3	12.197	10	3 46 40.08	2.2418	24 50 11.6	8.088
11	2 9 0.69	1.9303	16 44 19.4	12.138	11	3 48 54.81	2.2492	24 58 13.4	7.971
12	2 10 56.67	1.9357	16 56 25.9	12.078	12	3 51 9.98	2.2566	25 6 8.1	7.853
13	2 12 52.97	1.9411	17 8 28.8	12.018	13	3 53 25.60	2.2640	25 13 55.7	7.733
14	2 14 49.60	1.9467	17 20 28.1	11.957	14	3 55 41.66	2.2714	25 21 36.0	7.611
15	2 16 46.57	1.9523	17 32 23.6	11.893	15	3 57 58.17	2.2788	25 29 9.0	7.489
16	2 18 43.87	1.9579	17 44 15.3	11.830	16	4 0 15.12	2.2862	25 36 34.6	7.365
17	2 20 41.52	1.9637	17 56 3.2	11.765	17	4 2 32.51	2.2936	25 43 52.8	7.239
18	2 22 39.51	1.9694	18 7 47.1	11.699	18	4 4 50.35	2.3009	25 51 3.4	7.113
19	2 24 37.85	1.9753	18 19 27.1	11.632	19	4 7 8.62	2.3083	25 58 6.4	6.985
20	2 26 36.55	1.9812	18 31 3.0	11.564	20	4 9 27.34	2.3156	26 5 1.6	6.855
21	2 28 35.60	1.9872	18 42 34.8	11.495	21	4 11 46.49	2.3229	26 11 49.0	6.724
22	2 30 35.01	1.9933	18 54 2.4	11.424	22	4 14 6.09	2.3302	26 18 28.5	6.592
23	2 32 34.79	1.9994	19 5 25.8	11.353	23	4 16 26.12	2.3374	26 25 0.0	6.458
24	2 34 34.94	2.0056	N.19 16 44.8	11.281	24	4 18 46.58	2.3447	N.26 31 23.4	6.322

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 25.					WEDNESDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	4 18 46.58	2.3447	N.26 31 23.4	6.322	0	6 18 22.02	2.5991	N.28 34 17.9	1.629
1	4 21 7.48	2.3519	26 37 38.7	6.186	1	6 20 58.04	2.6014	28 32 34.5	1.818
2	4 23 28.81	2.3590	26 43 45.7	6.048	2	6 23 34.19	2.6035	28 30 39.8	2.007
3	4 25 50.56	2.3661	26 49 44.4	5.908	3	6 26 10.46	2.6055	28 28 33.7	2.196
4	4 28 12.74	2.3732	26 55 34.7	5.767	4	6 28 46.85	2.6074	28 26 16.3	2.386
5	4 30 35.35	2.3803	27 1 16.5	5.625	5	6 31 23.35	2.6091	28 23 47.4	2.576
6	4 32 58.38	2.3873	27 6 49.7	5.482	6	6 33 59.94	2.6106	28 21 7.2	2.766
7	4 35 21.82	2.3942	27 12 14.3	5.337	7	6 36 36.62	2.6120	28 18 15.5	2.957
8	4 37 45.68	2.4011	27 17 30.1	5.190	8	6 39 13.38	2.6132	28 15 12.4	3.147
9	4 40 9.95	2.4079	27 22 37.1	5.042	9	6 41 50.21	2.6143	28 11 57.8	3.338
10	4 42 34.63	2.4147	27 27 35.2	4.893	10	6 44 27.10	2.6153	28 8 31.8	3.529
11	4 44 59.71	2.4213	27 32 24.3	4.743	11	6 47 4.04	2.6161	28 4 54.3	3.721
12	4 47 25.19	2.4280	27 37 4.4	4.592	12	6 49 41.02	2.6167	28 1 5.3	3.912
13	4 49 51.07	2.4346	27 41 35.3	4.438	13	6 52 18.04	2.6171	27 57 4.8	4.104
14	4 52 17.34	2.4410	27 45 56.9	4.283	14	6 54 55.08	2.6174	27 52 52.8	4.295
15	4 54 43.99	2.4474	27 50 9.3	4.128	15	6 57 32.13	2.6175	27 48 29.4	4.486
16	4 57 11.03	2.4538	27 54 12.3	3.971	16	7 0 9.18	2.6175	27 43 54.5	4.678
17	4 59 38.45	2.4601	27 58 5.8	3.812	17	7 2 46.23	2.6174	27 39 8.0	4.870
18	5 2 6.24	2.4663	28 1 49.7	3.653	18	7 5 23.27	2.6171	27 34 10.1	5.061
19	5 4 34.40	2.4723	28 5 24.1	3.492	19	7 8 0.28	2.6166	27 29 0.7	5.252
20	5 7 2.92	2.4782	28 8 48.8	3.330	20	7 10 37.26	2.6161	27 23 39.9	5.443
21	5 9 31.79	2.4842	28 12 3.7	3.166	21	7 13 14.20	2.6153	27 18 7.6	5.633
22	5 12 1.02	2.4901	28 15 8.7	3.002	22	7 15 51.10	2.6144	27 12 24.0	5.823
23	5 14 30.60	2.4958	N.28 18 3.9	2.837	23	7 18 27.94	2.6134	N.27 6 28.9	6.013
	TUESDAY 26.					THURSDAY 28.			
0	5 17 0.51	2.5013	N.28 20 49.1	2.669	0	7 21 4.71	2.6122	N.27 0 22.4	6.202
1	5 19 30.76	2.5068	28 23 24.2	2.502	1	7 23 41.40	2.6108	26 54 4.6	6.392
2	5 22 1.33	2.5122	28 25 49.3	2.333	2	7 26 18.01	2.6094	26 47 35.5	6.580
3	5 24 32.23	2.5176	28 28 4.1	2.162	3	7 28 54.53	2.6078	26 40 55.0	6.768
4	5 27 3.44	2.5228	28 30 8.7	1.991	4	7 31 30.95	2.6061	26 34 3.2	6.956
5	5 29 34.96	2.5278	28 32 3.0	1.818	5	7 34 7.26	2.6043	26 27 0.2	7.143
6	5 32 6.78	2.5327	28 33 46.9	1.644	6	7 36 43.46	2.6023	26 19 46.1	7.329
7	5 34 38.89	2.5376	28 35 20.3	1.469	7	7 39 19.54	2.6002	26 12 20.8	7.514
8	5 37 11.29	2.5423	28 36 43.2	1.294	8	7 41 55.49	2.5980	26 4 44.4	7.699
9	5 39 43.96	2.5468	28 37 55.6	1.118	9	7 44 31.30	2.5956	25 56 56.9	7.883
10	5 42 16.91	2.5513	28 38 57.4	0.941	10	7 47 6.96	2.5931	25 48 58.4	8.067
11	5 44 50.12	2.5556	28 39 48.5	0.762	11	7 49 42.47	2.5906	25 40 48.9	8.250
12	5 47 23.58	2.5598	28 40 28.8	0.583	12	7 52 17.83	2.5879	25 32 28.4	8.432
13	5 49 57.29	2.5638	28 40 58.4	0.402	13	7 54 53.02	2.5850	25 23 57.0	8.613
14	5 52 31.24	2.5677	28 41 17.1	0.221	14	7 57 28.03	2.5821	25 15 14.9	8.793
15	5 55 5.42	2.5715	28 41 24.9	+0.039	15	8 0 2.87	2.5791	25 6 21.9	8.972
16	5 57 39.82	2.5752	28 41 21.8	−0.143	16	8 2 37.52	2.5759	24 57 18.2	9.150
17	6 0 14.44	2.5787	28 41 7.7	0.327	17	8 5 11.98	2.5727	24 48 3.9	9.327
18	6 2 49.26	2.5820	28 40 42.6	0.512	18	8 7 46.24	2.5693	24 38 39.0	9.503
19	6 5 24.28	2.5852	28 40 6.3	0.697	19	8 10 20.30	2.5659	24 29 3.6	9.678
20	6 7 59.48	2.5883	28 39 19.0	0.882	20	8 12 54.15	2.5623	24 19 17.7	9.852
21	6 10 34.87	2.5913	28 38 20.5	1.068	21	8 15 27.78	2.5587	24 9 21.4	10.024
22	6 13 10.43	2.5940	28 37 10.9	1.254	22	8 18 1.20	2.5551	23 59 14.8	10.196
23	6 15 46.15	2.5966	28 35 50.0	1.442	23	8 20 34.39	2.5513	23 48 57.9	10.366
24	6 18 22.02	2.5991	N.28 34 17.9	1.629	24	8 23 7.35	2.5474	N.23 38 30.9	10.534

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 29.			
	h m s	s	° ′ ″	″
0	8 23 7.35	2.5474	N.23 38 30.9	10.534
1	8 25 40.08	2.5435	23 27 53.8	10.702
2	8 28 12.57	2.5394	23 17 6.6	10.869
3	8 30 44.81	2.5353	23 6 9.5	11.033
4	8 33 16.81	2.5312	22 55 2.6	11.197
5	8 35 48.56	2.5271	22 43 45.8	11.360
6	8 38 20.06	2.5228	22 32 19.4	11.520
7	8 40 51.30	2.5184	22 20 43.4	11.679
8	8 43 22.27	2.5140	22 8 57.9	11.837
9	8 45 52.98	2.5097	21 57 2.9	11.993
10	8 48 23.43	2.5053	21 44 58.7	12.148
11	8 50 53.61	2.5007	21 32 45.2	12.302
12	8 53 23.51	2.4961	21 20 22.5	12.453
13	8 55 53.14	2.4915	21 7 50.8	12.603
14	8 58 22.49	2.4868	20 55 10.1	12.752
15	9 0 51.56	2.4822	20 42 20.6	12.898
16	9 3 20.35	2.4775	20 29 22.4	13.043
17	9 5 48.86	2.4728	20 16 15.5	13.186
18	9 8 17.09	2.4681	20 3 0.1	13.328
19	9 10 45.03	2.4633	19 49 36.2	13.468
20	9 13 12.69	2.4586	19 36 4.0	13.605
21	9 15 40.06	2.4538	19 22 23.6	13.741
22	9 18 7.14	2.4489	19 8 35.1	13.876
23	9 20 33.93	2.4442	N.18 54 38.5	14.008
	SATURDAY 30.			
0	9 23 0.44	2.4394	N.18 40 34.1	14.138
1	9 25 26.66	2.4346	18 26 21.9	14.268
2	9 27 52.59	2.4298	18 12 2.0	14.395
3	9 30 18.23	2.4249	17 57 34.5	14.520
4	9 32 43.58	2.4201	17 42 59.6	14.643
5	9 35 8.64	2.4153	17 28 17.4	14.764
6	9 37 33.42	2.4106	17 13 27.9	14.883
7	9 39 57.91	2.4058	16 58 31.4	15.000
8	9 42 22.12	2.4011	16 43 27.9	15.116
9	9 44 46.04	2.3963	16 28 17.5	15.229
10	9 47 9.68	2.3916	16 13 0.4	15.340
11	9 49 33.03	2.3869	15 57 36.7	15.450
12	9 51 56.11	2.3823	15 42 6.4	15.558
13	9 54 18.91	2.3777	15 26 29.8	15.663
14	9 56 41.43	2.3731	15 10 46.9	15.766
15	9 59 3.68	2.3686	14 54 57.9	15.867
16	10 1 25.66	2.3641	14 39 2.9	15.965
17	10 3 47.37	2.3596	14 23 2.1	16.062
18	10 6 8.81	2.3551	14 6 55.5	16.157
19	10 8 29.98	2.3507	13 50 43.2	16.251
20	10 10 50.89	2.3463	13 34 25.4	16.341
21	10 13 11.54	2.3420	13 18 2.3	16.429
22	10 15 31.93	2.3378	13 1 33.9	16.516
23	10 17 52.07	2.3336	12 45 0.4	16.600
24	10 20 11.96	2.3294	N.12 28 21.9	16.683

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY, 31.			
	h m s	s	° ′ ″	″
0	10 20 11.96	2.3294	N.12 28 21.9	16.683
1	10 22 31.60	2.3253	12 11 38.5	16.763
2	10 24 50.99	2.3212	11 54 50.4	16.841
3	10 27 10.14	2.3172	11 37 57.6	16.917
4	10 29 29.05	2.3132	11 21 0.4	16.990
5	10 31 47.73	2.3093	11 3 58.8	17.060
6	10 34 6.17	2.3055	10 46 53.0	17.131
7	10 36 24.39	2.3018	10 29 43.1	17.198
8	10 38 42.38	2.2981	10 12 29.3	17.263
9	10 41 0.16	2.2944	9 55 11.6	17.326
10	10 43 17.71	2.2908	9 37 50.2	17.387
11	10 45 35.05	2.2873	9 20 25.2	17.446
12	10 47 52.19	2.2839	9 2 56.7	17.503
13	10 50 9.12	2.2805	8 45 24.9	17.557
14	10 52 25.85	2.2772	8 27 49.9	17.609
15	10 54 42.38	2.2739	8 10 11.8	17.659
16	10 56 58.72	2.2708	7 52 30.8	17.707
17	10 59 14.87	2.2677	7 34 47.0	17.753
18	11 1 30.84	2.2647	7 17 0.5	17.796
19	11 3 46.63	2.2618	6 59 11.5	17.837
20	11 6 2.25	2.2588	6 41 20.0	17.877
21	11 8 17.69	2.2560	6 23 26.3	17.913
22	11 10 32.97	2.2533	6 5 30.4	17.948
23	11 12 48.09	2.2507	N. 5 47 32.5	17.982
	MONDAY, SEPT. 1.			
0	11 15 3.05	2.2481	N. 5 29 32.6	18.012

PHASES OF THE MOON.

			d	h	m
●	New Moon	Aug.	2	0	58.1
☽	First Quarter		8	16	3.0
○	Full Moon		16	8	27.0
☾	Last Quarter		24	12	17.8
●	New Moon		31	8	38.1

			d	h
☾	Perigee	Aug.	3	11.2
☾	Apogee		18	20.1
☾	Perigee		31	19.1

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to / Subtracted from Apparent Time.	Diff. for 1 Hour
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Mon.	1	10 40 14.50	9.078	N. 8 24 57.6	−54.35	15 52.97	64.38	0 4.17	0.777
Tues.	2	10 43 52.22	9.065	8 3 9.2	54.68	15 53.20	64.34	0 14.62	0.789
Wed.	3	10 47 29.64	9.053	7 41 13.0	54.99	15 53.43	64.30	0 33.71	0.801
Thur.	4	10 51 6.78	9.042	7 19 9.4	−55.29	15 53.67	64.26	0 53.08	0.813
Fri.	5	10 54 43.65	9.031	6 56 58.8	55.58	15 53.91	64.22	1 12.71	0.823
Sat.	6	10 58 20.27	9.021	6 34 41.6	55.85	15 54.16	64.19	1 32.59	0.833
SUN.	7	11 1 56.65	9.012	6 12 18.1	−56.11	15 54.41	64.16	1 52.70	0.843
Mon.	8	11 5 32.82	9.003	5 49 48.5	56.35	15 54.66	64.13	2 13.03	0.851
Tues.	9	11 9 8.80	8.995	5 27 13.2	56.58	15 54.91	64.11	2 33.55	0.859
Wed.	10	11 12 44.60	8.988	5 4 32.5	−56.80	15 55.16	64.09	2 54.25	0.866
Thur.	11	11 16 20.24	8.982	4 41 46.8	57.00	15 55.42	64.07	3 15.10	0.872
Fri.	12	11 19 55.75	8.977	4 18 56.3	57.19	15 55.67	64.05	3 36.09	0.877
Sat.	13	11 23 31.15	8.973	3 56 1.3	−57.37	15 55.93	64.04	3 57.19	0.881
SUN.	14	11 27 6.46	8.970	3 33 2.2	57.54	15 56.19	64.03	4 18.38	0.884
Mon.	15	11 30 41.70	8.968	3 9 59.3	57.69	15 56.45	64.02	4 39.63	0.887
Tues.	16	11 34 16.90	8.966	2 46 52.8	−57.83	15 56.71	64.01	5 0.92	0.888
Wed.	17	11 37 52.08	8.966	2 23 43.1	57.96	15 56.96	64.01	5 22.23	0.888
Thur.	18	11 41 27.27	8.967	2 0 30.5	58.08	15 57.22	64.01	5 43.55	0.888
Fri.	19	11 45 2.47	8.968	1 37 15.3	−58.18	15 57.48	64.02	6 4.84	0.886
Sat.	20	11 48 37.72	8.970	1 13 57.8	58.27	15 57.74	64.03	6 26.08	0.884
SUN.	21	11 52 13.05	8.973	0 50 38.4	58.35	15 58.00	64.04	6 47.25	0.880
Mon.	22	11 55 48.47	8.978	0 27 17.3	−58.41	15 58.26	64.05	7 8.33	0.876
Tues.	23	11 59 24.00	8.983	N. 0 3 54.8	58.46	15 58.53	64.07	7 29.30	0.871
Wed.	24	12 2 59.66	8.989	S. 0 19 28.7	58.49	15 58.79	64.09	7 50.13	0.865
Thur.	25	12 6 35.48	8.996	0 42 52.8	−58.50	15 59.06	64.11	8 10.81	0.858
Fri.	26	12 10 11.48	9.004	1 6 17.2	58.51	15 59.33	64.13	8 31.31	0.850
Sat.	27	12 13 47.67	9.012	1 29 41.5	58.50	15 59.60	64.16	8 51.62	0.842
SUN.	28	12 17 24.07	9.022	1 53 5.4	−58.48	15 59.87	64.19	9 11.72	0.833
Mon.	29	12 21 0.70	9.032	2 16 28.5	58.44	16 0.14	64.22	9 31.59	0.823
Tues.	30	12 24 37.58	9.042	2 39 50.4	58.38	16 0.41	64.26	9 51.21	0.812
Wed.	31	12 28 14.72	9.053	S. 3 3 10.7	−58.31	16 0.69	64.30	10 10.56	0.801

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting $0^s.18$ from the sidereal time.

The sign − prefixed to the hourly change of declination indicates that north declinations are decreasing; south declinations increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time to be Subtracted from / Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Mon.	1	10 40 14.50	9.080	N. 8 24 57.4	−54.36	0 4.16	0.777	10 40 10.33
Tues.	2	10 43 52.26	9.067	8 3 8.8	54.69	0 14.63	0.789	10 44 6.89
Wed.	3	10 47 29.73	9.055	7 41 12.4	55.00	0 33.72	0.801	10 48 3.44
Thur.	4	10 51 6.91	9.044	7 19 8.6	−55.30	0 53.09	0.813	10 52 0.00
Fri.	5	10 54 43.83	9.033	6 56 57.7	55.59	1 12.72	0.823	10 55 56.55
Sat.	6	10 58 20.50	9.023	6 34 40.2	55.86	1 32.61	0.833	10 59 53.10
SUN.	7	11 1 56.93	9.014	6 12 16.3	−56.12	1 52.73	0.843	11 3 49.66
Mon.	8	11 5 33.15	9.005	5 49 46.4	56.37	2 13.06	0.851	11 7 46.21
Tues.	9	11 9 9.18	8.997	5 27 10.8	56.60	2 33.59	0.859	11 11 42.77
Wed.	10	11 12 45.03	8.990	5 4 29.8	−56.82	2 54.29	0.866	11 15 39.32
Thur.	11	11 16 20.72	8.984	4 41 43.7	57.02	3 15.15	0.872	11 19 35.87
Fri.	12	11 19 56.28	8.979	4 18 52.9	57.21	3 36.14	0.877	11 23 32.43
Sat.	13	11 23 31.73	8.975	3 55 57.6	−57.39	3 57.24	0.881	11 27 28.98
SUN.	14	11 27 7.10	8.972	3 32 58.1	57.56	4 18.43	0.884	11 31 25.54
Mon.	15	11 30 42.40	8.970	3 9 54.8	57.71	4 39.69	0.887	11 35 22.09
Tues.	16	11 34 17.65	8.968	2 46 48.0	−57.85	5 0.99	0.888	11 39 18.64
Wed.	17	11 37 52.88	8.968	2 23 38.0	57.98	5 22.31	0.888	11 43 15.20
Thur.	18	11 41 28.12	8.969	2 0 25.0	58.10	5 43.63	0.888	11 47 11.75
Fri.	19	11 45 3.38	8.971	1 37 9.5	−58.20	6 4.93	0.886	11 51 8.30
Sat.	20	11 48 38.68	8.973	1 13 51.6	58.29	6 26.17	0.884	11 55 4.86
SUN.	21	11 52 14.06	8.976	0 50 31.8	58.36	6 47.35	0.880	11 59 1.41
Mon.	22	11 55 49.53	8.980	0 27 10.3	−58.42	7 8.44	0.876	12 2 57.97
Tues.	23	11 59 25.11	8.985	N. 0 3 47.5	58.47	7 29.41	0.871	12 6 54.52
Wed.	24	12 3 0.83	8.991	S. 0 19 36.3	58.50	7 50.25	0.865	12 10 51.07
Thur.	25	12 6 36.70	8.998	0 43 0.8	−58.52	8 10.93	0.858	12 14 47.63
Fri.	26	12 10 12.75	9.006	1 6 25.5	58.53	8 31.43	0.850	12 18 44.18
Sat.	27	12 13 48.99	9.014	1 29 50.2	58.52	8 51.74	0.842	12 22 40.73
SUN.	28	12 17 25.45	9.024	1 53 14.4	−58.49	9 11.84	0.833	12 26 37.29
Mon.	29	12 21 2.13	9.034	2 16 37.8	58.45	9 31.71	0.823	12 30 33.84
Tues.	30	12 24 39.06	9.044	2 40 0.0	58.39	9 51.34	0.812	12 34 30.40
Wed.	31	12 28 16.25	9.055	S. 3 3 20.6	−58.32	10 10.70	0.801	12 38 26.95

Note.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing; south declinations, increasing.

Diff. for 1 Hour.
$+9^{s}.8565$.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S True Longitude. λ			λ'		Diff. for 1 Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.		
		°	'	"	'	"	"	"			h	m	s
1	244	158	25	46.3	25	10.5	145.28	−0.13	0.003 8706	−43.5	13	17	38.63
2	245	159	23	53.9	23	18.0	145.35	0.27	0.003 7653	44.2	13	13	42.72
3	246	160	22	3.0	21	27.0	145.41	0.40	0.003 6582	44.9	13	9	46.82
4	247	161	20	13.6	19	37.5	145.47	−0.53	0.003 5495	−45.6	13	5	50.91
5	248	162	18	25.8	17	49.5	145.54	0.63	0.003 4393	46.2	13	1	55.00
6	249	163	16	39.4	16	3.0	145.60	0.71	0.003 3277	46.7	12	57	59.09
7	250	164	14	54.4	14	17.9	145.66	−0.76	0.003 2150	−47.2	12	54	3.18
8	251	165	13	10.9	12	34.4	145.72	0.78	0.003 1013	47.6	12	50	7.28
9	252	166	11	29.0	10	52.3	145.78	0.77	0.002 9867	47.9	12	46	11.37
10	253	167	9	48.6	9	11.7	145.85	−0.73	0.002 8715	−48.1	12	42	15.46
11	254	168	8	9.8	7	32.8	145.92	0.66	0.002 7557	48.3	12	38	19.55
12	255	169	6	32.6	5	55.5	145.99	0.57	0.002 6394	48.5	12	34	23.64
13	256	170	4	57.1	4	19.9	146.06	−0.45	0.002 5228	−48.7	12	30	27.74
14	257	171	3	23.4	2	46.2	146.13	0.33	0.002 4058	48.8	12	26	31.83
15	258	172	1	51.6	1	14.2	146.21	0.21	0.002 2886	48.9	12	22	35.92
16	259	172	60	21.6	59	44.1	146.29	−0.09	0.002 1711	−49.0	12	18	40.01
17	260	173	58	53.6	58	16.0	146.37	+0.03	0.002 0535	49.1	12	14	44.11
18	261	174	57	27.6	56	49.9	146.46	0.15	0.001 9358	49.1	12	10	48.20
19	262	175	56	3.7	55	25.9	146.55	+0.26	0.001 8178	−49.2	12	6	52.29
20	263	176	54	41.9	54	4.0	146.64	0.35	0.001 6996	49.3	12	2	56.38
21	264	177	53	22.3	52	44.3	146.73	0.40	0.001 5812	49.4	11	59	0.47
22	265	178	52	4.9	51	26.8	146.82	+0.42	0.001 4625	−49.5	11	55	4.57
23	266	179	50	49.8	50	11.6	146.91	0.41	0.001 3434	49.7	11	51	8.66
24	267	180	49	37.0	48	58.6	147.01	0.38	0.001 2239	49.9	11	47	12.75
25	268	181	48	26.4	47	47.9	147.10	+0.31	0.001 1038	−50.2	11	43	16.84
26	269	182	47	18.1	46	39.5	147.20	0.21	0.000 9831	50.5	11	39	20.93
27	270	183	46	12.1	45	33.4	147.30	+0.09	0.000 8616	50.8	11	35	25.03
28	271	184	45	8.3	44	29.4	147.39	−0.04	0.000 7392	−51.2	11	31	29.12
29	272	185	44	6.6	43	27.6	147.48	0.18	0.000 6159	51.6	11	27	33.21
30	273	186	43	7.0	42	27.9	147.56	0.33	0.000 4917	52.0	11	23	37.30
31	274	187	42	9.4	41	30.2	147.64	−0.46	0.000 3666	−52.4	11	19	41.40

Note.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
$-9^s.8296$.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	16 44.0	16 42.8	61 18.90	−0.171	61 14.39	−0.578	0 36.2	2.16	0.6
2	16 40.3	16 36.6	61 5.13	0.958	60 51.53	1.302	1 27.3	2.12	1.6
3	16 31.8	16 26.2	60 34.08	1.598	60 13.39	1.840	2 18.2	2.14	2.6
4	16 19.8	16 13.0	59 50.12	−2.029	59 24.96	−2.156	3 10.1	2.20	3.6
5	16 5.8	15 58.4	58 58.60	2.230	58 31.64	2.254	4 3.7	2.27	4.6
6	15 51.1	15 43.8	58 4.66	2.236	57 38.13	2.181	4 59.2	2.35	5.6
7	15 36.8	15 30.2	57 12.44	−2.095	56 47.94	−1.984	5 56.1	2.38	6.6
8	15 23.9	15 18.0	56 24.87	1.856	56 3.41	1.716	6 52.9	2.34	7.6
9	15 12.6	15 7.7	55 43.66	1.571	55 25.69	1.422	7 48.0	2.24	8.6
10	15 3.3	14 59.4	55 9.52	−1.271	54 55.16	−1.121	8 39.9	2.09	9.6
11	14 56.0	14 53.0	54 42.57	0.977	54 31.69	0.837	9 28.3	1.94	10.6
12	14 50.5	14 48.4	54 22.46	0.702	54 14.81	0.574	10 13.0	1.80	11.6
13	14 46.8	14 45.5	54 8.65	−0.453	54 3.92	−0.336	10 54.9	1.70	12.6
14	14 44.6	14 44.0	54 0.57	0.223	53 58.57	−0.112	11 34.8	1.63	13.6
15	14 43.8	14 44.0	53 57.88	−0.003	53 58.49	+0.106	12 13.6	1.61	14.6
16	14 44.5	14 45.4	54 0.42	+0.217	54 3.69	+0.329	12 52.4	1.63	15.6
17	14 46.7	14 48.3	54 8.33	0.444	54 14.38	0.565	13 32.2	1.69	16.6
18	14 50.4	14 52.9	54 21.92	0.692	54 31.03	0.826	14 14.0	1.80	17.6
19	14 55.8	14 59.2	54 41.76	+0.964	54 54.19	+1.107	14 58.8	1.94	18.6
20	15 3.0	15 7.4	55 8.37	1.256	55 24.34	1.406	15 47.3	2.11	19.6
21	15 12.2	15 17.6	55 42.12	1.556	56 1.69	1.704	16 40.0	2.28	20.6
22	15 23.4	15 29.6	56 22.99	+1.845	56 45.90	+1.973	17 36.3	2.41	21.6
23	15 36.3	15 43.3	57 10.27	2.086	57 35.87	2.176	18 35.0	2.46	22.6
24	15 50.5	15 57.8	58 2.37	2.235	58 29.35	2.258	19 34.0	2.44	23.6
25	16 5.2	16 12.4	58 56.37	+2.239	59 22.87	+2.169	20 31.7	2.36	24.6
26	16 19.3	16 25.7	59 48.20	2.044	60 11.71	1.864	21 27.0	2.25	25.6
27	16 31.4	16 36.3	60 32.71	1.627	60 50.54	1.335	22 20.1	2.18	26.6
28	16 40.1	16 42.7	61 4.55	+0.992	61 14.21	+0.612	23 11.8	2.14	27.6
29	16 44.1	16 44.1	61 19.13	+0.206	61 19.10	−0.212	6	. .	28.6
30	16 42.7	16 40.0	61 14.06	−0.626	61 4.15	1.022	0 3.2	2.15	0.3
31	16 36.1	16 31.0	60 49.69	1.382	60 31.16	1.698	0 55.6	2.22	1.3
32	16 25.0	16 18.3	60 9.18	−1.958	59 44.43	−2.159	1 49.9	2.31	2.3

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 1.					WEDNESDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	11 15 3.05	2.2481	N. 5 29 32.6	18.012	0	13 1 33.57	2.2210	S. 8 50 59.6	17.083
1	11 17 17.86	2.2456	5 11 31.0	18.041	1	13 3 46.87	2.2224	9 8 2.6	17.017
2	11 19 32.52	2.2433	4 53 27.7	18.067	2	13 6 0.26	2.2238	9 25 1.6	16.948
3	11 21 47.05	2.2410	4 35 22.9	18.092	3	13 8 13.73	2.2253	9 41 56.4	16.878
4	11 24 1.44	2.2387	4 17 16.7	18.113	4	13 10 27.30	2.2269	9 58 47.0	16.807
5	11 26 15.69	2.2365	3 59 9.3	18.133	5	13 12 40.96	2.2285	10 15 33.3	16.735
6	11 28 29.82	2.2344	3 41 0.7	18.152	6	13 14 54.72	2.2302	10 32 15.2	16.661
7	11 30 43.82	2.2324	3 22 51.1	18.167	7	13 17 8.59	2.2320	10 48 52.6	16.584
8	11 32 57.71	2.2305	3 4 40.6	18.181	8	13 19 22.56	2.2338	11 5 25.3	16.506
9	11 35 11.48	2.2286	2 46 29.4	18.192	9	13 21 36.65	2.2357	11 21 53.3	16.427
10	11 37 25.14	2.2268	2 28 17.6	18.202	10	13 23 50.85	2.2377	11 38 16.5	16.345
11	11 39 38.70	2.2252	2 10 5.2	18.209	11	13 26 5.17	2.2397	11 54 34.7	16.262
12	11 41 52.17	2.2237	1 51 52.5	18.214	12	13 28 19.62	2.2418	12 10 47.9	16.178
13	11 44 5.54	2.2222	1 33 39.5	18.217	13	13 30 34.19	2.2439	12 26 56.0	16.092
14	11 46 18.83	2.2207	1 15 26.4	18.219	14	13 32 48.89	2.2462	12 42 58.9	16.003
15	11 48 32.03	2.2193	0 57 13.2	18.218	15	13 35 3.73	2.2484	12 58 56.4	15.913
16	11 50 45.15	2.2181	0 39 0.2	18.215	16	13 37 18.70	2.2507	13 14 48.5	15.823
17	11 52 58.20	2.2169	0 20 47.4	18.210	17	13 39 33.81	2.2530	13 30 35.2	15.731
18	11 55 11.18	2.2158	N. 0 2 35.0	18.203	18	13 41 49.06	2.2555	13 46 16.2	15.636
19	11 57 24.10	2.2148	S. 0 15 36.9	18.194	19	13 44 4.47	2.2580	14 1 51.5	15.541
20	11 59 36.96	2.2139	0 33 48.3	18.183	20	13 46 20.02	2.2604	14 17 21.1	15.444
21	12 1 49.77	2.2131	0 51 58.9	18.169	21	13 48 35.72	2.2630	14 32 44.8	15.345
22	12 4 2.53	2.2123	1 10 8.6	18.154	22	13 50 51.58	2.2657	14 48 2.5	15.245
23	12 6 15.24	2.2116	S. 1 28 17.4	18.137	23	13 53 7.60	2.2683	S. 15 3 14.2	15.143
	TUESDAY 2.					THURSDAY 4.			
0	12 8 27.92	2.2111	S. 1 46 25.1	18.118	0	13 55 23.77	2.2709	S. 15 18 19.7	15.040
1	12 10 40.57	2.2106	2 4 31.6	18.097	1	13 57 40.11	2.2737	15 33 19.0	14.936
2	12 12 53.19	2.2101	2 22 36.7	18.073	2	13 59 56.61	2.2764	15 48 12.0	14.829
3	12 15 5.78	2.2097	2 40 40.4	18.048	3	14 2 13.28	2.2792	16 2 58.5	14.721
4	12 17 18.36	2.2095	2 58 42.5	18.022	4	14 4 30.12	2.2821	16 17 38.5	14.612
5	12 19 30.92	2.2093	3 16 43.0	17.993	5	14 6 47.13	2.2850	16 32 12.0	14.502
6	12 21 43.48	2.2092	3 34 41.7	17.962	6	14 9 4.32	2.2879	16 46 38.8	14.391
7	12 23 56.03	2.2092	3 52 38.4	17.928	7	14 11 21.68	2.2908	17 0 58.9	14.278
8	12 26 8.59	2.2093	4 10 33.1	17.894	8	14 13 39.22	2.2938	17 15 12.1	14.163
9	12 28 21.15	2.2094	4 28 25.7	17.857	9	14 15 56.94	2.2968	17 29 18.4	14.047
10	12 30 33.72	2.2097	4 46 16.0	17.818	10	14 18 14.84	2.2998	17 43 17.7	13.930
11	12 32 46.31	2.2100	5 4 3.9	17.777	11	14 20 32.92	2.3029	17 57 10.0	13.812
12	12 34 58.92	2.2103	5 21 49.3	17.735	12	14 22 51.19	2.3060	18 10 55.1	13.691
13	12 37 11.55	2.2108	5 39 32.1	17.691	13	14 25 9.64	2.3091	18 24 32.9	13.569
14	12 39 24.22	2.2114	5 57 12.2	17.645	14	14 27 28.28	2.3122	18 38 3.4	13.447
15	12 41 36.92	2.2120	6 14 49.5	17.597	15	14 29 47.10	2.3153	18 51 26.6	13.324
16	12 43 49.66	2.2127	6 32 23.8	17.547	16	14 32 6.11	2.3185	19 4 42.3	13.198
17	12 46 2.45	2.2135	6 49 55.1	17.495	17	14 34 25.32	2.3217	19 17 50.4	13.072
18	12 48 15.28	2.2143	7 7 23.2	17.442	18	14 36 44.72	2.3248	19 30 50.9	12.944
19	12 50 28.17	2.2152	7 24 48.1	17.387	19	14 39 4.30	2.3279	19 43 43.7	12.816
20	12 52 41.11	2.2162	7 42 9.6	17.329	20	14 41 24.07	2.3312	19 56 28.8	12.686
21	12 54 54.12	2.2174	7 59 27.6	17.270	21	14 43 44.04	2.3344	20 9 6.0	12.554
22	12 57 7.20	2.2186	8 16 42.0	17.209	22	14 46 4.20	2.3376	20 21 35.3	12.422
23	12 59 20.35	2.2198	8 33 52.7	17.147	23	14 48 24.55	2.3408	20 33 56.6	12.288
24	13 1 33.57	2.2210	S. 8 50 59.6	17.083	24	14 50 45.09	2.3439	S. 20 46 9.9	12.154

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff for 1 Min.
	FRIDAY 5.					SUNDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	14 50 45.09	2.3439	S. 20 46 9.9	12.154	0	16 46 22.65	2.4519	S. 27 36 58.2	4.702
1	14 53 5.82	2.3472	20 58 15.1	12.018	1	16 48 49.78	2.4524	27 41 35.3	4.535
2	14 55 26.75	2.3504	21 10 12.1	11.882	2	16 51 16.94	2.4528	27 46 2.4	4.368
3	14 57 47.87	2.3535	21 22 0.9	11.743	3	16 53 44.12	2.4531	27 50 19.5	4.201
4	15 0 9.17	2.3567	21 33 41.3	11.604	4	16 56 11.31	2.4533	27 54 26.5	4.032
5	15 2 30.67	2.3599	21 45 13.4	11.464	5	16 58 38.51	2.4533	27 58 23.4	3.864
6	15 4 52.36	2.3630	21 56 37.0	11.323	6	17 1 5.70	2.4533	28 2 10.2	3.697
7	15 7 14.23	2.3661	22 7 52.1	11.181	7	17 3 32.90	2.4532	28 5 47.0	3.529
8	15 9 36.29	2.3692	22 18 58.7	11.037	8	17 6 0.08	2.4528	28 9 13.7	3.361
9	15 11 58.54	2.3723	22 29 56.6	10.893	9	17 8 27.24	2.4524	28 12 30.3	3.193
10	15 14 20.97	2.3753	22 40 45.9	10.748	10	17 10 54.37	2.4519	28 15 36.9	3.026
11	15 16 43.58	2.3783	22 51 26.4	10.602	11	17 13 21.47	2.4514	28 18 33.4	2.858
12	15 19 6.37	2.3813	23 1 58.2	10.456	12	17 15 48.54	2.4507	28 21 19.9	2.691
13	15 21 29.34	2.3843	23 12 21.1	10.308	13	17 18 15.56	2.4499	28 23 56.3	2.523
14	15 23 52.49	2.3873	23 22 35.1	10.158	14	17 20 42.53	2.4490	28 26 22.7	2.357
15	15 26 15.82	2.3902	23 32 40.1	10.008	15	17 23 9.44	2.4479	28 28 39.1	2.189
16	15 28 39.32	2.3931	23 42 36.1	9.858	16	17 25 36.28	2.4467	28 30 45.4	2.022
17	15 31 2.99	2.3959	23 52 23.1	9.707	17	17 28 3.05	2.4456	28 32 41.8	1.857
18	15 33 26.83	2.3987	24 2 0.9	9.554	18	17 30 29.75	2.4442	28 34 28.2	1.690
19	15 35 50.84	2.4015	24 11 29.6	9.401	19	17 32 56.36	2.4427	28 36 4.6	1.524
20	15 38 15.01	2.4041	24 20 49.0	9.247	20	17 35 22.88	2.4412	28 37 31.1	1.358
21	15 40 39.33	2.4067	24 29 59.2	9.092	21	17 37 49.31	2.4396	28 38 47.6	1.192
22	15 43 3.81	2.4093	24 39 0.1	8.937	22	17 40 15.63	2.4378	28 39 54.2	1.027
23	15 45 28.45	2.4119	S. 24 47 51.6	8.780	23	17 42 41.84	2.4358	S. 28 40 50.9	0.863
	SATURDAY 6.					MONDAY 8.			
0	15 47 53.24	2.4143	S. 24 56 33.7	8.623	0	17 45 7.93	2.4338	S. 28 41 37.8	0.699
1	15 50 18.17	2.4168	25 5 6.4	8.466	1	17 47 33.90	2.4317	28 42 14.8	0.535
2	15 52 43.25	2.4192	25 13 29.6	8.308	2	17 49 59.74	2.4296	28 42 42.0	0.372
3	15 55 8.47	2.4215	25 21 43.3	8.149	3	17 52 25.45	2.4273	28 42 59.4	0.209
4	15 57 33.83	2.4237	25 29 47.5	7.990	4	17 54 51.01	2.4248	28 43 7.1	−0.047
5	15 59 59.32	2.4258	25 37 42.1	7.829	5	17 57 16.42	2.4223	28 43 5.0	+0.116
6	16 2 24.93	2.4279	25 45 27.0	7.668	6	17 59 41.68	2.4197	28 42 53.2	0.277
7	16 4 50.67	2.4300	25 53 2.3	7.507	7	18 2 6.78	2.4169	28 42 31.8	0.438
8	16 7 16.53	2.4320	26 0 27.9	7.346	8	18 4 31.71	2.4140	28 42 0.7	0.598
9	16 9 42.51	2.4339	26 7 43.8	7.183	9	18 6 56.46	2.4111	28 41 20.0	0.758
10	16 12 8.60	2.4357	26 14 49.9	7.020	10	18 9 21.04	2.4081	28 40 29.7	0.917
11	16 14 34.79	2.4373	26 21 46.2	6.857	11	18 11 45.43	2.4049	28 39 29.9	1.076
12	16 17 1.08	2.4390	26 28 32.8	6.694	12	18 14 9.63	2.4017	28 38 20.6	1.234
13	16 19 27.47	2.4406	26 35 9.5	6.530	13	18 16 33.63	2.3983	28 37 1.8	1.392
14	16 21 53.95	2.4421	26 41 36.4	6.365	14	18 18 57.43	2.3949	28 35 33.6	1.548
15	16 24 20.52	2.4435	26 47 53.3	6.200	15	18 21 21.02	2.3914	28 33 56.0	1.704
16	16 26 47.17	2.4448	26 54 0.4	6.036	16	18 23 44.40	2.3878	28 32 9.1	1.859
17	16 29 13.90	2.4461	26 59 57.6	5.870	17	18 26 7.56	2.3841	28 30 12.9	2.014
18	16 31 40.70	2.4472	27 5 44.8	5.703	18	18 28 30.49	2.3803	28 28 7.4	2.167
19	16 34 7.56	2.4482	27 11 22.0	5.537	19	18 30 53.20	2.3765	28 25 52.8	2.320
20	16 36 34.48	2.4491	27 16 49.3	5.371	20	18 33 15.67	2.3725	28 23 29.0	2.472
21	16 39 1.45	2.4500	27 22 6.5	5.204	21	18 35 37.90	2.3684	28 20 56.1	2.624
22	16 41 28.48	2.4508	27 27 13.8	5.037	22	18 37 59.88	2.3643	28 18 14.1	2.775
23	16 43 55.55	2.4514	27 32 11.0	4.870	23	18 40 21.61	2.3601	28 15 23.1	2.925
24	16 46 22.65	2.4519	S. 27 36 58.2	4.702	24	18 42 43.09	2.3557	S. 28 12 23.1	3.074

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 9.			
	h m s	s	° ′ ″	″
0	18 42 43.09	2.3557	S. 28 12 23.1	3.074
1	18 45 4.30	2.3513	28 9 14.2	3.222
2	18 47 25.25	2.3469	28 5 56.4	3.370
3	18 49 45.93	2.3424	28 2 29.8	3.516
4	18 52 6.34	2.3378	27 58 54.5	3.661
5	18 54 26.47	2.3332	27 55 10.5	3.806
6	18 56 46.32	2.3284	27 51 17.8	3.950
7	18 59 5.88	2.3236	27 47 16.5	4.093
8	19 1 25.15	2.3187	27 43 6.6	4.235
9	19 3 44.13	2.3138	27 38 48.3	4.376
10	19 6 2.81	2.3088	27 34 21.5	4.516
11	19 8 21.19	2.3038	27 29 46.4	4.654
12	19 10 39.27	2.2987	27 25 3.0	4.793
13	19 12 57.04	2.2936	27 20 11.3	4.930
14	19 15 14.50	2.2883	27 15 11.4	5.066
15	19 17 31.64	2.2830	27 10 3.4	5.201
16	19 19 48.46	2.2777	27 4 47.3	5.335
17	19 22 4.97	2.2724	26 59 23.2	5.468
18	19 24 21.15	2.2670	26 53 51.2	5.600
19	19 26 37.01	2.2616	26 48 11.2	5.732
20	19 28 52.54	2.2561	26 42 23.3	5.862
21	19 31 7.74	2.2506	26 36 27.7	5.991
22	19 33 22.61	2.2451	26 30 24.4	6.118
23	19 35 37.15	2.2395	S. 26 24 13.5	6.246
	WEDNESDAY 10.			
0	19 37 51.35	2.2338	S. 26 17 54.9	6.372
1	19 40 5.21	2.2282	26 11 28.8	6.497
2	19 42 18.73	2.2225	26 4 55.3	6.620
3	19 44 31.91	2.2168	25 58 14.4	6.743
4	19 46 44.75	2.2112	25 51 26.1	6.865
5	19 48 57.25	2.2054	25 44 30.6	6.985
6	19 51 9.40	2.1996	25 37 27.9	7.105
7	19 53 21.20	2.1938	25 30 18.0	7.223
8	19 55 32.65	2.1880	25 23 1.1	7.340
9	19 57 43.76	2.1822	25 15 37.2	7.457
10	19 59 54.52	2.1764	25 8 6.3	7.572
11	20 2 4.93	2.1706	25 0 28.6	7.686
12	20 4 14.99	2.1648	24 52 44.0	7.799
13	20 6 24.70	2.1589	24 44 52.7	7.911
14	20 8 34.06	2.1530	24 36 54.7	8.022
15	20 10 43.06	2.1471	24 28 50.1	8.132
16	20 12 51.71	2.1413	24 20 38.9	8.240
17	20 15 0.02	2.1355	24 12 21.3	8.347
18	20 17 7.97	2.1296	24 3 57.3	8.453
19	20 19 15.57	2.1237	23 55 26.9	8.559
20	20 21 22.82	2.1179	23 46 50.2	8.663
21	20 23 29.72	2.1120	23 38 7.3	8.767
22	20 25 36.26	2.1062	23 29 18.2	8.869
23	20 27 42.46	2.1004	23 20 23.0	8.970
24	20 29 48.31	2.0946	S. 23 11 21.8	9.070

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 11.			
	h m s	s	° ′ ″	″
0	20 29 48.31	2.0946	S. 23 11 21.8	9.070
1	20 31 53.81	2.0888	23 2 14.6	9.168
2	20 33 58.96	2.0830	22 53 1.6	9.266
3	20 36 3.77	2.0772	22 43 42.7	9.363
4	20 38 8.23	2.0715	22 34 18.1	9.458
5	20 40 12.35	2.0658	22 24 47.8	9.553
6	20 42 16.13	2.0602	22 15 11.8	9.647
7	20 44 19.57	2.0544	22 5 30.2	9.739
8	20 46 22.66	2.0487	21 55 43.1	9.830
9	20 48 25.41	2.0430	21 45 50.6	9.920
10	20 50 27.82	2.0374	21 35 52.7	10.009
11	20 52 29.90	2.0319	21 25 49.5	10.097
12	20 54 31.65	2.0264	21 15 41.0	10.184
13	20 56 33.07	2.0208	21 5 27.4	10.270
14	20 58 34.15	2.0153	20 55 8.6	10.356
15	21 0 34.90	2.0098	20 44 44.7	10.439
16	21 2 35.33	2.0045	20 34 15.9	10.522
17	21 4 35.44	1.9991	20 23 42.1	10.603
18	21 6 35.22	1.9937	20 13 3.5	10.684
19	21 8 34.68	1.9883	20 2 20.0	10.764
20	21 10 33.82	1.9831	19 51 31.8	10.843
21	21 12 32.65	1.9778	19 40 38.9	10.921
22	21 14 31.16	1.9726	19 29 41.3	10.997
23	21 16 29.36	1.9674	S. 19 18 39.2	11.072
	FRIDAY 12.			
0	21 18 27.25	1.9623	S. 19 7 32.6	11.147
1	21 20 24.84	1.9572	18 56 21.5	11.221
2	21 22 22.12	1.9522	18 45 6.1	11.293
3	21 24 19.10	1.9472	18 33 46.3	11.366
4	21 26 15.79	1.9423	18 22 22.2	11.436
5	21 28 12.18	1.9373	18 10 54.0	11.505
6	21 30 8.27	1.9324	17 59 21.6	11.574
7	21 32 4.07	1.9277	17 47 45.1	11.642
8	21 33 59.59	1.9230	17 36 4.6	11.708
9	21 35 54.83	1.9182	17 24 20.1	11.775
10	21 37 49.78	1.9135	17 12 31.6	11.840
11	21 39 44.45	1.9089	17 0 39.3	11.903
12	21 41 38.85	1.9044	16 48 43.3	11.965
13	21 43 32.98	1.8998	16 36 43.5	12.027
14	21 45 26.83	1.8953	16 24 40.0	12.089
15	21 47 20.42	1.8909	16 12 32.8	12.149
16	21 49 13.74	1.8866	16 0 22.1	12.208
17	21 51 6.81	1.8823	15 48 7.9	12.266
18	21 52 59.62	1.8780	15 35 50.2	12.323
19	21 54 52.17	1.8738	15 23 29.1	12.379
20	21 56 44.48	1.8697	15 11 4.7	12.434
21	21 58 36.54	1.8656	14 58 37.0	12.489
22	22 0 28.35	1.8615	14 46 6.0	12.543
23	22 2 19.92	1.8576	14 33 31.8	12.595
24	22 4 11.26	1.8537	S. 14 20 54.6	12.646

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 13.					MONDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	22 4 11.26	1.8537	S.14 20 54.6	12.646	0	23 29 47.61	1.7376	S. 3 30 30.7	14.140
1	22 6 2.36	1.8498	14 8 14.3	12.697	1	23 31 31.84	1.7367	3 16 21.9	14.152
2	22 7 53.23	1.8460	13 55 30.9	12.748	2	23 33 16.01	1.7358	3 2 12.5	14.163
3	22 9 43.88	1.8422	13 42 44.5	12.797	3	23 35 0.14	1.7352	2 48 2.4	14.173
4	22 11 34.30	1.8385	13 29 55.2	12.845	4	23 36 44.23	1.7345	2 33 51.7	14.182
5	22 13 24.50	1.8349	13 17 3.1	12.892	5	23 38 28.28	1.7339	2 19 40.5	14.191
6	22 15 14.49	1.8313	13 4 8.2	12.938	6	23 40 12.30	1.7334	2 5 28.8	14.199
7	22 17 4.26	1.8278	12 51 10.5	12.984	7	23 41 56.29	1.7329	1 51 16.6	14.207
8	22 18 53.83	1.8244	12 38 10.1	13.029	8	23 43 40.25	1.7326	1 37 4.0	14.213
9	22 20 43.19	1.8210	12 25 7.0	13.072	9	23 45 24.20	1.7323	1 22 51.1	14.218
10	22 22 32.35	1.8177	12 12 1.4	13.115	10	23 47 8.13	1.7320	1 8 37.8	14.223
11	22 24 21.31	1.8143	11 58 53.2	13.157	11	23 48 52.04	1.7318	0 54 24.3	14.227
12	22 26 10.07	1.8111	11 45 42.5	13.198	12	23 50 35.95	1.7317	0 40 10.6	14.230
13	22 27 58.64	1.8080	11 32 29.4	13.238	13	23 52 19.85	1.7317	0 25 56.7	14.232
14	22 29 47.03	1.8049	11 19 13.9	13.278	14	23 54 3.75	1.7317	S. 0 11 42.7	14.234
15	22 31 35.23	1.8019	11 5 56.0	13.317	15	23 55 47.65	1.7317	N. 0 2 31.4	14.236
16	22 33 23.25	1.7990	10 52 35.8	13.355	16	23 57 31.56	1.7319	0 16 45.6	14.237
17	22 35 11.11	1.7960	10 39 13.4	13.392	17	23 59 15.48	1.7322	0 30 59.8	14.237
18	22 36 58.78	1.7931	10 25 48.8	13.428	18	0 0 59.42	1.7325	0 45 14.0	14.235
19	22 38 46.28	1.7903	10 12 22.0	13.464	19	0 2 43.38	1.7328	0 59 28.0	14.233
20	22 40 33.62	1.7877	9 58 53.1	13.498	20	0 4 27.36	1.7332	1 13 41.9	14.230
21	22 42 20.80	1.7850	9 45 22.2	13.532	21	0 6 11.36	1.7337	1 27 55.6	14.227
22	22 44 7.82	1.7823	9 31 49.3	13.565	22	0 7 55.40	1.7343	1 42 9.1	14.223
23	22 45 54.68	1.7798	S. 9 18 14.4	13.597	23	0 9 39.47	1.7349	N. 1 56 22.4	14.218
	SUNDAY 14.					TUESDAY 16.			
0	22 47 41.40	1.7774	S. 9 4 37.6	13.628	0	0 11 23.59	1.7357	N. 2 10 35.3	14.213
1	22 49 27.97	1.7750	8 50 59.0	13.658	1	0 13 7.75	1.7363	2 24 47.9	14.207
2	22 51 14.40	1.7727	8 37 18.6	13.687	2	0 14 51.95	1.7371	2 39 0.1	14.199
3	22 53 0.69	1.7703	8 23 36.5	13.716	3	0 16 36.20	1.7380	2 53 11.8	14.191
4	22 54 46.84	1.7682	8 9 52.7	13.744	4	0 18 20.51	1.7390	3 7 23.0	14.182
5	22 56 32.87	1.7661	7 56 7.2	13.772	5	0 20 4.88	1.7401	3 21 33.7	14.173
6	22 58 18.77	1.7639	7 42 20.1	13.798	6	0 21 49.32	1.7412	3 35 43.8	14.163
7	23 0 4.54	1.7618	7 28 31.4	13.824	7	0 23 33.82	1.7423	3 49 53.2	14.152
8	23 1 50.19	1.7599	7 14 41.2	13.848	8	0 25 18.39	1.7435	4 4 2.0	14.140
9	23 3 35.73	1.7580	7 0 49.6	13.872	9	0 27 3.04	1.7448	4 18 10.0	14.127
10	23 5 21.15	1.7562	6 46 56.5	13.896	10	0 28 47.77	1.7462	4 32 17.3	14.114
11	23 7 6.47	1.7545	6 33 2.1	13.918	11	0 30 32.58	1.7476	4 46 23.7	14.100
12	23 8 51.69	1.7528	6 19 6.3	13.940	12	0 32 17.48	1.7491	5 0 29.3	14.086
13	23 10 36.81	1.7512	6 5 9.3	13.961	13	0 34 2.47	1.7507	5 14 34.0	14.070
14	23 12 21.83	1.7496	5 51 11.0	13.982	14	0 35 47.56	1.7523	5 28 37.7	14.053
15	23 14 6.76	1.7481	5 37 11.5	14.001	15	0 37 32.75	1.7540	5 42 40.4	14.036
16	23 15 51.60	1.7466	5 23 10.9	14.019	16	0 39 18.04	1.7557	5 56 42.0	14.018
17	23 17 36.35	1.7452	5 9 9.2	14.037	17	0 41 3.43	1.7575	6 10 42.6	14.000
18	23 19 21.02	1.7439	4 55 6.5	14.053	18	0 42 48.94	1.7595	6 24 42.0	13.980
19	23 21 5.62	1.7427	4 41 2.8	14.070	19	0 44 34.57	1.7614	6 38 40.2	13.960
20	23 22 50.15	1.7416	4 26 58.1	14.086	20	0 46 20.31	1.7634	6 52 37.2	13.939
21	23 24 34.61	1.7404	4 12 52.5	14.101	21	0 48 6.18	1.7656	7 6 32.9	13.917
22	23 26 19.00	1.7393	3 58 46.0	14.115	22	0 49 52.18	1.7678	7 20 27.2	13.894
23	23 28 3.33	1.7384	3 44 38.7	14.128	23	0 51 38.31	1.7700	7 34 20.2	13.871
24	23 29 47.61	1.7376	S. 3 30 30.7	14.140	24	0 53 24.58	1.7723	N. 7 48 11.7	13.846

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 17.					FRIDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	0 53 24.58	1.7723	N. 7 48 11.7	13.846	0	2 22 22.83	1.9590	N.18 8 39.0	11.656
1	0 55 10.99	1.7747	8 2 1.7	13.821	1	2 24 20.53	1.9644	18 20 16.3	11.587
2	0 56 57.54	1.7771	8 15 50.2	13.795	2	2 26 18.56	1.9698	18 31 49.4	11.517
3	0 58 44.24	1.7796	8 29 37.1	13.768	3	2 28 16.91	1.9752	18 43 18.3	11.446
4	1 0 31.09	1.7822	8 43 22.4	13.741	4	2 30 15.59	1.9808	18 54 42.9	11.374
5	1 2 18.10	1.7848	8 57 6.0	13.712	5	2 32 14.61	1.9864	19 6 3.2	11.301
6	1 4 5.27	1.7875	9 10 47.9	13.683	6	2 34 13.96	1.9920	19 17 19.0	11.226
7	1 5 52.60	1.7902	9 24 28.0	13.653	7	2 36 13.65	1.9977	19 28 30.3	11.151
8	1 7 40.10	1.7931	9 38 6.3	13.622	8	2 38 13.68	2.0034	19 39 37.1	11.074
9	1 9 27.77	1.7960	9 51 42.7	13.591	9	2 40 14.06	2.0092	19 50 39.2	10.997
10	1 11 15.62	1.7990	10 5 17.2	13.558	10	2 42 14.78	2.0149	20 1 36.7	10.918
11	1 13 3.65	1.8020	10 18 49.7	13.525	11	2 44 15.85	2.0208	20 12 29.4	10.838
12	1 14 51.86	1.8051	10 32 20.2	13.491	12	2 46 17.27	2.0267	20 23 17.3	10.757
13	1 16 40.26	1.8083	10 45 48.6	13.456	13	2 48 19.05	2.0326	20 34 0.3	10.675
14	1 18 28.85	1.8115	10 59 14.9	13.420	14	2 50 21.18	2.0385	20 44 38.3	10.592
15	1 20 17.64	1.8148	11 12 39.0	13.383	15	2 52 23.67	2.0445	20 55 11.3	10.508
16	1 22 6.63	1.8182	11 26 0.9	13.346	16	2 54 26.52	2.0506	21 5 39.2	10.423
17	1 23 55.82	1.8216	11 39 20.5	13.308	17	2 56 29.74	2.0567	21 16 2.0	10.336
18	1 25 45.22	1.8252	11 52 37.8	13.268	18	2 58 33.32	2.0628	21 26 19.5	10.248
19	1 27 34.84	1.8287	12 5 52.7	13.228	19	3 0 37.27	2.0689	21 36 31.8	10.160
20	1 29 24.67	1.8323	12 19 5.2	13.187	20	3 2 41.59	2.0751	21 46 38.7	10.069
21	1 31 14.72	1.8360	12 32 15.1	13.144	21	3 4 46.28	2.0813	21 56 40.1	9.978
22	1 33 4.99	1.8398	12 45 22.5	13.102	22	3 6 51.35	2.0876	22 6 36.0	9.886
23	1 34 55.49	1.8436	N.12 58 27.3	13.058	23	3 8 56.79	2.0938	N.22 16 26.4	9.793
	THURSDAY 18.					SATURDAY 20.			
0	1 36 46.22	1.8475	N.13 11 29.5	13.013	0	3 11 2.61	2.1002	N.22 26 11.1	9.698
1	1 38 37.19	1.8514	13 24 28.9	12.968	1	3 13 8.81	2.1065	22 35 50.1	9.602
2	1 40 28.39	1.8554	13 37 25.6	12.922	2	3 15 15.39	2.1128	22 45 23.3	9.504
3	1 42 19.84	1.8595	13 50 19.5	12.874	3	3 17 22.35	2.1192	22 54 50.6	9.406
4	1 44 11.53	1.3637	14 3 10.5	12.826	4	3 19 29.69	2.1256	23 4 12.0	9.307
5	1 46 3.48	1.8679	14 15 58.6	12.777	5	3 21 37.42	2.1320	23 13 27.4	9.206
6	1 47 55.68	1.8722	14 28 43.7	12.726	6	3 23 45.53	2.1384	23 22 36.7	9.104
7	1 49 48.14	1.8765	14 41 25.7	12.675	7	3 25 54.03	2.1449	23 31 39.9	9.001
8	1 51 40.86	1.8808	14 54 4.7	12.623	8	3 28 2.92	2.1514	23 40 36.8	8.897
9	1 53 33.84	1.8852	15 6 40.5	12.569	9	3 30 12.20	2.1579	23 49 27.5	8.792
10	1 55 27.09	1.8898	15 19 13.0	12.515	10	3 32 21.87	2.1644	23 58 11.8	8.685
11	1 57 20.62	1.8944	15 31 42.3	12.461	11	3 34 31.93	2.1709	24 6 49.7	8.577
12	1 59 14.42	1.8990	15 44 8.3	12.405	12	3 36 42.38	2.1774	24 15 21.1	8.468
13	2 1 8.50	1.9037	15 56 30.9	12.348	13	3 38 53.22	2.1839	24 23 45.9	8.358
14	2 3 2.86	1.9084	16 8 50.0	12.290	14	3 41 4.45	2.1904	24 32 4.1	8.247
15	2 4 57.51	1.9133	16 21 5.7	12.232	15	3 43 16.07	2.1970	24 40 15.5	8.133
16	2 6 52.45	1.9182	16 33 17.8	12.171	16	3 45 28.09	2.2035	24 48 20.1	8.019
17	2 8 47.69	1.9231	16 45 26 2	12.110	17	3 47 40.49	2.2100	24 56 17.8	7.904
18	2 10 43.22	1.9280	16 57 31.0	12.048	18	3 49 53.29	2.2166	25 4 8.6	7.788
19	2 12 39.05	1.9330	17 9 32.0	11.985	19	3 52 6.48	2.2231	25 11 52.4	7.671
20	2 14 35.18	1.9381	17 21 29.2	11.922	20	3 54 20.06	2.2296	25 19 29.1	7.552
21	2 16 31.62	1.9433	17 33 22.6	11.858	21	3 56 34.03	2.2361	25 26 58.6	7.432
22	2 18 28.38	1.9486	17 45 12.1	11.792	22	3 58 48.39	2.2426	25 34 20.9	7.310
23	2 20 25.45	1.9538	17 56 57.6	11.724	23	4 1 3.14	2.2490	25 41 35.8	7.187
24	2 22 22.83	1.9590	N.18 8 39.0	11.656	24	4 3 18.27	2.2554	N.25 48 43.4	7.064

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 21.					TUESDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	4 3 18.27	2.2554	N.25 48 43.4	7.064	0	5 58 7.26	2.4997	N.28 43 18.0	0.183
1	4 5 33.79	2.2619	25 55 43.5	6.938	1	6 0 37.33	2.5026	28 43 1.8	0.356
2	4 7 49.70	2.2683	26 2 36.0	6.812	2	6 3 7.57	2.5053	28 42 35.3	0.529
3	4 10 5.99	2.2747	26 9 21.0	6.686	3	6 5 37.97	2.5079	28 41 58.3	0.703
4	4 12 22.66	2.2810	26 15 58.3	6.557	4	6 8 8.52	2.5103	28 41 10.9	0.877
5	4 14 39.71	2.2874	26 22 27.8	6.426	5	6 10 39.21	2.5127	28 40 13.0	1.052
6	4 16 57.15	2.2937	26 28 49.4	6.295	6	6 13 10.04	2.5149	28 39 4.6	1.228
7	4 19 14.96	2.2999	26 35 3.2	6.163	7	6 15 41.00	2.5170	28 37 45.6	1.405
8	4 21 33.14	2.3062	26 41 9.0	6.030	8	6 18 12.08	2.5190	28 36 16.0	1.581
9	4 23 51.70	2.3124	26 47 6.8	5.895	9	6 20 43.28	2.5208	28 34 35.9	1.757
10	4 26 10.63	2.3186	26 52 56.4	5.759	10	6 23 14.58	2.5225	28 32 45.2	1.934
11	4 28 29.93	2.3247	26 58 37.9	5.622	11	6 25 45.98	2.5241	28 30 43.8	2.112
12	4 30 49.60	2.3308	27 4 11.1	5.484	12	6 28 17.47	2.5255	28 28 31.8	2.289
13	4 33 9.63	2.3368	27 9 36.0	5.345	13	6 30 49.04	2.5268	28 26 9.1	2.467
14	4 35 30.02	2.3428	27 14 52.5	5.204	14	6 33 20.69	2.5281	28 23 35.7	2.646
15	4 37 50.76	2.3487	27 20 0.5	5.062	15	6 35 52.41	2.5292	28 20 51.6	2.824
16	4 40 11.86	2.3546	27 24 59.9	4.919	16	6 38 24.19	2.5301	28 17 56.8	3.003
17	4 42 33.31	2.3603	27 29 50.8	4.776	17	6 40 56.02	2.5309	28 14 51.3	3.182
18	4 44 55.10	2.3661	27 34 33.0	4.630	18	6 43 27.90	2.5316	28 11 35.0	3.361
19	4 47 17.24	2.3718	27 39 6.4	4.484	19	6 45 59.81	2.5322	28 8 8.0	3.539
20	4 49 39.72	2.3774	27 43 31.1	4.337	20	6 48 31.76	2.5327	28 4 30.3	3.718
21	4 52 2.53	2.3830	27 47 46.9	4.188	21	6 51 3.73	2.5329	28 0 41.8	3.898
22	4 54 25.68	2.3885	27 51 53.7	4.038	22	6 53 35.71	2.5331	27 56 42.5	4.078
23	4 56 49.15	2.3939	N.27 55 51.5	3.888	23	6 56 7.70	2.5332	N.27 52 32.5	4.257
	MONDAY 22.					WEDNESDAY 24.			
0	4 59 12.95	2.3993	N.27 59 40.3	3.737	0	6 58 39.70	2.5332	N.27 48 11.7	4.436
1	5 1 37.07	2.4046	28 3 19.9	3.583	1	7 1 11.68	2.5329	27 43 40.2	4.615
2	5 4 1.50	2.4098	28 6 50.3	3.430	2	7 3 43.65	2.5327	27 38 57.9	4.794
3	5 6 26.24	2.4148	28 10 11.5	3.276	3	7 6 15.60	2.5323	27 34 4.9	4.973
4	5 8 51.28	2.4198	28 13 23.4	3.120	4	7 8 47.52	2.5317	27 29 1.2	5.151
5	5 11 16.62	2.4248	28 16 25.9	2.962	5	7 11 19.41	2.5311	27 23 46.8	5.329
6	5 13 42.26	2.4297	28 19 18.9	2.804	6	7 13 51.25	2.5303	27 18 21.7	5.508
7	5 16 8.18	2.4344	28 22 2.4	2.646	7	7 16 23.04	2.5294	27 12 45.9	5.686
8	5 18 34.39	2.4391	28 24 36.4	2.487	8	7 18 54.78	2.5284	27 6 59.4	5.863
9	5 21 0.87	2.4437	28 27 0.8	2.326	9	7 21 26.45	2.5273	27 1 2.3	6.041
10	5 23 27.63	2.4482	28 29 15.5	2.164	10	7 23 58.05	2.5261	26 54 54.5	6.218
11	5 25 54.65	2.4525	28 31 20.5	2.002	11	7 26 29.58	2.5248	26 48 36.1	6.394
12	5 28 21.93	2.4568	28 33 15.7	1.838	12	7 29 1.03	2.5233	26 42 7.2	6.570
13	5 30 49.47	2.4610	28 35 1.0	1.673	13	7 31 32.38	2.5217	26 35 27.7	6.747
14	5 33 17.25	2.4650	28 36 36.5	1.509	14	7 34 3.64	2.5201	26 28 37.6	6.922
15	5 35 45.27	2.4690	28 38 2.1	1.343	15	7 36 34.79	2.5183	26 21 37.1	7.096
16	5 38 13.53	2.4729	28 39 17.7	1.177	16	7 39 5.84	2.5165	26 14 26.1	7.271
17	5 40 42.02	2.4767	28 40 23.3	1.009	17	7 41 36.77	2.5146	26 7 4.6	7.445
18	5 43 10.73	2.4803	28 41 18.8	0.841	18	7 44 7.59	2.5126	25 59 32.7	7.618
19	5 45 39.65	2.4838	28 42 4.2	0.672	19	7 46 38.28	2.5104	25 51 50.5	7.790
20	5 48 8.78	2.4873	28 42 39.4	0.502	20	7 49 8.84	2.5082	25 43 57.9	7.962
21	5 50 38.12	2.4906	28 43 4.5	0.332	21	7 51 39.26	2.5058	25 35 55.0	8.133
22	5 53 7.65	2.4937	28 43 19.3	+0.161	22	7 54 9.54	2.5034	25 27 41.9	8.303
23	5 55 37.36	2.4967	28 43 23.8	−0.011	23	7 56 39.67	2.5010	25 19 18.6	8.473
24	5 58 7.26	2.4997	N.28 43 18.0	0.183	24	7 59 9.66	2.4985	N.25 10 45.1	8.642

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 25.					SATURDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	7 59 9.66	2.4985	N.25 10 45.1	8.642	0	9 55 12.09	2.3297	N.15 21 15.4	15.409
1	8 1 39.49	2.4958	25 2 1.5	8.811	1	9 57 31.77	2.3262	15 5 47.7	15.513
2	8 4 9.16	2.4931	24 53 7.8	8.979	2	9 59 51.24	2.3228	14 50 13.8	15.616
3	8 6 38.66	2.4903	24 44 4.0	9.146	3	10 2 10.51	2.3195	14 34 33.8	15.718
4	8 9 7.99	2.4874	24 34 50.3	9.311	4	10 4 29.58	2.3162	14 18 47.7	15.818
5	8 11 37.15	2.4845	24 25 26.7	9.476	5	10 6 48.45	2.3128	14 2 55.7	15.915
6	8 14 6.13	2.4815	24 15 53.2	9.640	6	10 9 7.12	2.3096	13 46 57.9	16.011
7	8 16 34.93	2.4784	24 6 9.9	9.803	7	10 11 25.60	2.3063	13 30 54.4	16.104
8	8 19 3.54	2.4753	23 56 16.8	9.966	8	10 13 43.88	2.3032	13 14 45.4	16.196
9	8 21 31.97	2.4722	23 46 14.0	10.127	9	10 16 1.98	2.3001	12 58 30.9	16.287
10	8 24 0.20	2.4689	23 36 1.6	10.287	10	10 18 19.89	2.2970	12 42 11.0	16.375
11	8 26 28.24	2.4657	23 25 39.6	10.446	11	10 20 37.62	2.2940	12 25 45.9	16.462
12	8 28 56.08	2.4623	23 15 8.1	10.604	12	10 22 55.17	2.2910	12 9 15.6	16.547
13	8 31 23.72	2.4589	23 4 27.1	10.761	13	10 25 12.54	2.2881	11 52 40.3	16.629
14	8 33 51.15	2.4554	22 53 36.8	10.917	14	10 27 29.74	2.2853	11 36 0.1	16.710
15	8 36 18.37	2.4519	22 42 37.1	11.072	15	10 29 46.78	2.2826	11 19 15.1	16.789
16	8 38 45.38	2.4484	22 31 28.2	11.225	16	10 32 3.65	2.2798	11 2 25.4	16.866
17	8 41 12.18	2.4449	22 20 10.1	11.377	17	10 34 20.35	2.2771	10 45 31.2	16.941
18	8 43 38.77	2.4413	22 8 42.9	11.528	18	10 36 36.90	2.2745	10 28 32.5	17.015
19	8 46 5.14	2.4377	21 57 6.7	11.678	19	10 38 53.29	2.2719	10 11 29.4	17.087
20	8 48 31.29	2.4340	21 45 21.5	11.827	20	10 41 9.53	2.2695	9 54 22.1	17.156
21	8 50 57.22	2.4303	21 33 27.4	11.975	21	10 43 25.63	2.2671	9 37 10.7	17.223
22	8 53 22.93	2.4267	21 21 24.5	12.121	22	10 45 41.58	2.2647	9 19 55.3	17.288
23	8 55 48.42	2.4229	N.21 9 12.9	12.266	23	10 47 57.39	2.2624	N. 9 2 36.1	17.352
	FRIDAY 26.					SUNDAY 28.			
0	8 58 13.68	2.4191	N.20 56 52.6	12.409	0	10 50 13.07	2.2602	N. 8 45 13.1	17.414
1	9 0 38.71	2.4153	20 44 23.8	12.551	1	10 52 28.62	2.2581	8 27 46.4	17.473
2	9 3 3.52	2.4116	20 31 46.5	12.692	2	10 54 44.04	2.2560	8 10 16.3	17.530
3	9 5 28.10	2.4078	20 19 0.7	12.832	3	10 56 59.34	2.2540	7 52 42.8	17.586
4	9 7 52.46	2.4041	20 6 6.6	12.970	4	10 59 14.52	2.2520	7 35 6.0	17.640
5	9 10 16.59	2.4003	19 53 4.3	13.107	5	11 1 29.58	2.2502	7 17 26.0	17.692
6	9 12 40.49	2.3964	19 39 53.8	13.242	6	11 3 44.54	2.2485	6 59 43.0	17.741
7	9 15 4.16	2.3926	19 26 35.3	13.375	7	11 5 59.40	2.2467	6 41 57.1	17.788
8	9 17 27.60	2.3888	19 13 8.8	13.507	8	11 8 14.15	2.2450	6 24 8.4	17.834
9	9 19 50.82	2.3850	18 59 34.4	15.638	9	11 10 28.80	2.2435	6 6 17.0	17.878
10	9 22 13.80	2.3812	18 45 52.2	13.767	10	11 12 43.37	2.2421	5 48 23.1	17.919
11	9 24 36.56	2.3774	18 32 2.3	13.895	11	11 14 57.85	2.2406	5 30 26.7	17.958
12	9 26 59.09	2.3736	18 18 4.8	14.021	12	11 17 12.24	2.2392	5 12 28.1	17.995
13	9 29 21.39	2.3698	18 3 59.8	14.146	13	11 19 26.56	2.2380	4 54 27.3	18.031
14	9 31 43.47	2.3661	17 49 47.3	14.269	14	11 21 40.80	2.2368	4 36 24.4	18.064
15	9 34 5.32	2.3623	17 35 27.5	14.390	15	11 23 54.97	2.2357	4 18 19.6	18.095
16	9 36 26.95	2.3587	17 21 0.5	14.510	16	11 26 9.08	2.2347	4 0 13.0	18.124
17	9 38 48.36	2.3549	17 6 26.3	14.628	17	11 28 23.13	2.2338	3 42 4.7	18.152
18	9 41 9.54	2.3513	16 51 45.1	14.745	18	11 30 37.13	2.2329	3 23 54.8	18.177
19	9 43 30.51	2.3477	16 36 56.9	14.860	19	11 32 51.08	2.2321	3 5 43.5	18.199
20	9 45 51.26	2.3440	16 22 1.9	14.973	20	11 35 4.98	2.2313	2 47 30.9	18.220
21	9 48 11.79	2.3403	16 7 0.1	15.085	21	11 37 18.84	2.2307	2 29 17.1	18.238
22	9 50 32.10	2.3367	15 51 51.7	15.194	22	11 39 32.66	2.2302	2 11 2.3	18.255
23	9 52 52.20	2.3332	15 36 36.8	15.302	23	11 41 46.46	2.2297	1 52 46.5	18.270
24	9 55 12.09	2.3297	N.15 21 15.4	15.409	24	11 44 0.23	2.2293	N. 1 34 29.9	18.283

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY, 29.			
	h m s	s	° ′ ″	″
0	11 44 0.23	2.2293	N. 1 34 29.9	18.283
1	11 46 13.98	2.2290	1 16 12.6	18.293
2	11 48 27.71	2.2288	0 57 54.8	18.301
3	11 50 41.43	2.2287	0 39 36.5	18.307
4	11 52 55.15	2.2286	0 21 18.0	18.310
5	11 55 8.86	2.2286	N. 0 2 59.3	18.312
6	11 57 22.58	2.2287	S. 0 15 19.5	18.312
7	11 59 36.31	2.2289	0 33 38.2	18.310
8	12 1 50.05	2.2292	0 51 56.7	18.306
9	12 4 3.81	2.2295	1 10 14.9	18.299
10	12 6 17.59	2.2299	1 28 32.6	18.290
11	12 8 31.40	2.2304	1 46 49.7	18.279
12	12 10 45.24	2.2310	2 5 6.1	18.267
13	12 12 59.12	2.2317	2 23 21.7	18.252
14	12 15 13.04	2.2324	2 41 36.3	18.234
15	12 17 27.01	2.2332	2 59 49.8	18.215
16	12 19 41.03	2.2342	3 18 2.1	18.194
17	12 21 55.11	2.2352	3 36 13.1	18.171
18	12 24 9.25	2.2362	3 54 22.6	18.145
19	12 26 23.45	2.2373	4 12 30.5	18.117
20	12 28 37.72	2.2385	4 30 36.7	18.088
21	12 30 52.07	2.2398	4 48 41.1	18.057
22	12 33 6.50	2.2412	5 6 43.5	18.022
23	12 35 21.01	2.2427	S. 5 24 43.8	17.986
	TUESDAY 30.			
0	12 37 35.62	2.2442	S. 5 42 41.8	17.948
1	12 39 50.32	2.2457	6 0 37.5	17.908
2	12 42 5.11	2.2474	6 18 30.8	17.867
3	12 44 20.01	2.2492	6 36 21.5	17.822
4	12 46 35.01	2.2510	6 54 9.4	17.775
5	12 48 50.13	2.2529	7 11 54.5	17.727
6	12 51 5.36	2.2548	7 29 36.7	17.677
7	12 53 20.71	2.2568	7 47 15.8	17.624
8	12 55 36.18	2.2589	8 4 51.6	17.570
9	12 57 51.78	2.2612	8 22 24.2	17.514
10	13 0 7.52	2.2634	8 39 53.3	17.455
11	13 2 23.39	2.2657	8 57 18.8	17.394
12	13 4 39.40	2.2681	9 14 40.6	17.332
13	13 6 55.56	2.2705	9 31 58.6	17.268
14	13 9 11.86	2.2729	9 49 12.7	17.201
15	13 11 28.31	2.2755	10 6 22.7	17.132
16	13 13 44.92	2.2782	10 23 28.5	17.061
17	13 16 1.69	2.2808	10 40 30.0	16.989
18	13 18 18.62	2.2835	10 57 27.2	16.915
19	13 20 35.71	2.2863	11 14 19.8	16.838
20	13 22 52.98	2.2892	11 31 7.7	16.759
21	13 25 10.42	2.2921	11 47 50.9	16.679
22	13 27 28.03	2.2950	12 4 29.2	16.597
23	13 29 45.82	2.2981	12 21 2.5	16.513
24	13 32 3.80	2.3012	S. 12 37 30.7	16.426

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY, OCTOBER 1.			
	h m s	s	° ′ ″	″
0	13 32 3.80	2.3012	S. 12 37 30.7	16.426

PHASES OF THE MOON.

			d	h	m
☽	First Quarter . .	Sept.	7	1	5.7
○	Full Moon		15	0	45.9
☾	Last Quarter		23	0	30.0
●	New Moon		29	16	56.8

			d	h
☾	Apogee	Sept.	15	0.3
☾	Perigee		29	6.2

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Wed.	1	12 28 14.72	9.053	S. 3 3 10.7	−58.31	16 0.69	64.30	10 10.56	0.801
Thur.	2	12 31 52.14	9.065	3 26 29.0	58.22	16 0.97	64.34	10 29.64	0.789
Fri.	3	12 35 29.85	9.078	3 49 44.9	58.11	16 1.25	64.39	10 48.44	0.777
Sat.	4	12 39 7.87	9.091	4 12 58.1	−57.99	16 1.53	64.44	11 6.92	0.763
SUN.	5	12 42 46.21	9.105	4 36 8.2	57.85	16 1.81	64.49	11 25.08	0.749
Mon.	6	12 46 24.90	9.120	4 59 14.7	57.69	16 2.10	64.54	11 42.89	0.735
Tues.	7	12 50 3.96	9.136	5 22 17.4	−57.52	16 2.38	64.60	12 0.34	0.719
Wed.	8	12 53 43.41	9.152	5 45 15.8	57.34	16 2.67	64.66	12 17.40	0.702
Thur.	9	12 57 23.27	9.169	6 8 9.8	57.14	16 2.95	64.73	12 34.05	0.685
Fri.	10	13 1 3.55	9.188	6 30 58.7	−56.93	16 3.23	64.80	12 50.27	0.667
Sat.	11	13 4 44.28	9.207	6 53 42.4	56.70	16 3.51	64.87	13 6.05	0.648
SUN.	12	13 8 25.48	9.227	7 16 20.4	56.46	16 3.79	64.94	13 21.36	0.628
Mon.	13	13 12 7.18	9.248	7 38 52.5	−56.20	16 4.07	65.02	13 36.18	0.607
Tues.	14	13 15 49.39	9.270	8 1 18.2	55.93	16 4.35	65.10	13 50.49	0.585
Wed.	15	13 19 32.13	9.292	8 23 37.2	55.64	16 4.62	65.18	14 4.27	0.562
Thur.	16	13 23 15.42	9.316	8 45 49.3	−55.34	16 4.89	65.26	14 17.49	0.539
Fri.	17	13 26 59.29	9.340	9 7 53.9	55.03	16 5.16	65.34	14 30.14	0.514
Sat.	18	13 30 43.76	9.365	9 29 50.7	54.70	16 5.43	65.43	14 42.19	0.489
SUN.	19	13 34 28.85	9.392	9 51 39.4	−54.35	16 5.70	65.52	14 53.63	0.463
Mon.	20	13 38 14.57	9.419	10 13 19.6	53.99	16 5.97	65.61	15 4.43	0.436
Tues.	21	13 42 0.95	9.447	10 34 50.9	53.61	16 6.23	65.70	15 14.58	0.409
Wed.	22	13 45 48.00	9.475	10 56 12.8	−53.21	16 6.49	65.80	15 24.06	0.380
Thur.	23	13 49 35.74	9.504	11 17 25.1	52.80	16 6.75	65.90	15 32.85	0.351
Fri.	24	13 53 24.19	9.534	11 38 27.4	52.38	16 7.01	66.00	15 40.93	0.322
Sat.	25	13 57 13.35	9.564	11 59 19.3	−51.93	16 7.27	66.10	15 48.30	0.292
SUN.	26	14 1 3.25	9.595	12 20 0.3	51.47	16 7.53	66.20	15 54.94	0.261
Mon.	27	14 4 53.90	9.626	12 40 29.9	50.99	16 7.78	66.31	16 0.84	0.230
Tues.	28	14 8 45.30	9.657	13 0 47.7	−50.49	16 8.04	66.42	16 5.98	0.198
Wed.	29	14 12 37.46	9.689	13 20 53.4	49.97	16 8.30	66.53	16 10.36	0.166
Thur.	30	14 16 30.38	9.721	13 40 46.5	49.44	16 8.56	66.64	16 13.98	0.134
Fri.	31	14 20 24.08	9.754	14 0 26.6	48.89	16 8.81	66.75	16 16.83	0.102
Sat.	32	14 24 18.56	9.786	S.14 19 53.2	−48.32	16 9.07	66.86	16 18.90	0.070

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting $0^s.18$ from the sidereal time.

The sign − prefixed to the hourly change of declination indicates that south declinations are increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Wed.	1	12 28 16.25	9.055	S. 3 3 20.6	−58.32	10 10.70	0.801	12 38 26.95
Thur.	2	12 31 53.72	9.067	3 26 39.2	58.23	10 29.78	0.789	12 42 23.50
Fri.	3	12 35 31.48	9.080	3 49 55.4	58.12	10 48.57	0.777	12 46 20.06
Sat.	4	12 39 9.55	9.093	4 13 8.9	−58.00	11 7.06	0.763	12 50 16.61
SUN.	5	12 42 47.94	9.107	4 36 19.2	57.86	11 25.22	0.749	12 54 13.16
Mon.	6	12 46 26.68	9.122	4 59 26.0	57.70	11 43.03	0.735	12 58 9.72
Tues.	7	12 50 5.79	9.138	5 22 28.9	−57.53	12 0.48	0.719	13 2 6.27
Wed.	8	12 53 45.29	9.154	5 45 27.6	57.35	12 17.54	0.702	13 6 2.83
Thur.	9	12 57 25.19	9.171	6 8 21.7	57.15	12 34.19	0.685	13 9 59.38
Fri.	10	13 1 5.52	9.190	6 31 10.9	−56.94	12 50.41	0.667	13 13 55.93
Sat.	11	13 4 46.29	9.209	6 53 54.8	56.71	13 6.19	0.648	13 17 52.49
SUN.	12	13 8 27.54	9.229	7 16 33.0	56.47	13 21.50	0.628	13 21 49.04
Mon.	13	13 12 9.28	9.250	7 39 5.3	−56.21	13 36.32	0.607	13 25 45.60
Tues.	14	13 15 51.53	9.272	8 1 31.2	55.94	13 50.63	0.585	13 29 42.15
Wed.	15	13 19 34.31	9.294	8 23 50.4	55.65	14 4.40	0.562	13 33 38.71
Thur.	16	13 23 17.64	9.318	8 46 2.5	−55.35	14 17.62	0.539	13 37 35.26
Fri.	17	13 27 1.55	9.342	9 8 7.2	55.03	14 30.26	0.514	13 41 31.81
Sat.	18	13 30 46.06	9.367	9 30 4.1	54.70	14 42.31	0.489	13 45 28.37
SUN.	19	13 34 31.18	9.393	9 51 52.8	−54.35	14 53.74	0.463	13 49 24.92
Mon.	20	13 38 16.94	9.420	10 13 33.1	53.99	15 4.54	0.436	13 53 21.48
Tues.	21	13 42 3.35	9.448	10 35 4.4	53.61	15 14.69	0.409	13 57 18.03
Wed.	22	13 45 50.43	9.476	10 56 26.4	−53.22	15 24.16	0.380	14 1 14.59
Thur.	23	13 49 38.20	9.505	11 17 38.8	52.81	15 32.94	0.351	14 5 11.14
Fri.	24	13 53 26.68	9.535	11 38 41.1	52.38	15 41.02	0.322	14 9 7.70
Sat.	25	13 57 15.87	9.565	11 59 33.0	−51.93	15 48.38	0.292	14 13 4.25
SUN.	26	14 1 5.80	9.596	12 20 13.9	51.47	15 55.01	0.261	14 17 0.81
Mon.	27	14 4 56.47	9.627	12 40 43.5	50.99	16 0.90	0.230	14 20 57.36
Tues.	28	14 8 47.89	9.658	13 1 1.4	−50.49	16 6.03	0.198	14 24 53.92
Wed.	29	14 12 40.07	9.690	13 21 7.0	49.97	16 10.41	0.166	14 28 50.47
Thur.	30	14 16 33.01	9.722	13 40 59.9	49.43	16 14.02	0.134	14 32 47.03
Fri.	31	14 20 26.73	9.754	14 0 39.8	48.88	16 16.86	0.102	14 36 43.58
Sat.	32	14 24 21.23	9.787	S. 14 20 6.3	−48.31	16 18.92	0.070	14 40 40.14

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign − prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 Hour, $+9^{s}.8565$. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S True Longitude. λ			THE SUN'S True Longitude. λ′		THE SUN'S Diff. for 1 Hour.	THE SUN'S Latitude.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.		
		°	′	″	′	″	″	″			h	m	s
1	274	187	42	9.4	41	30.2	147.64	−0.46	0.000 3666	−52.4	11	19	41.40
2	275	188	41	13.8	40	34.5	147.71	0.57	0.000 2407	52.7	11	15	45.49
3	276	189	40	20.0	39	40.6	147.79	0.66	0.000 1140	52.9	11	11	49.58
4	277	190	39	28.1	38	48.6	147.87	−0.72	9.999 9867	−53.1	11	7	53.67
5	278	191	38	37.9	37	58.3	147.94	0.74	9.999 8591	53.2	11	3	57.76
6	279	192	37	49.5	37	9.8	148.02	0.74	9.999 7312	53.3	11	0	1.86
7	280	193	37	2.8	36	23.0	148.09	−0.71	9.999 6032	−53.3	10	56	5.95
8	281	194	36	17.9	35	38.0	148.16	0.65	9.999 4754	53.2	10	52	10.04
9	282	195	35	34.8	34	54.8	148.24	0.57	9.999 3478	53.1	10	48	14.13
10	283	196	34	53.5	34	13.4	148.32	−0.47	9.999 2206	−52.9	10	44	18.22
11	284	197	34	14.1	33	33.8	148.39	0.35	9.999 0938	52.7	10	40	22.32
12	285	198	33	36.5	32	56.1	148.47	0.22	9.998 9677	52.4	10	36	26.41
13	286	199	33	0.9	32	20.3	148.55	−0.09	9.998 8423	−52.1	10	32	30.50
14	287	200	32	27.2	31	46.5	148.64	+0.04	9.998 7176	51.8	10	28	34.59
15	288	201	31	55.5	31	14.7	148.72	0.16	9.998 5937	51.4	10	24	38.68
16	289	202	31	25.8	30	44.9	148.81	+0.26	9.998 4708	−51.0	10	20	42.77
17	290	203	30	58.2	30	17.2	148.90	0.34	9.998 3488	50.6	10	16	46.86
18	291	204	30	32.8	29	51.7	148.99	0.40	9.998 2277	50.3	10	12	50.96
19	292	205	30	9.6	29	28.3	149.08	+0.44	9.998 1076	−49.9	10	8	55.05
20	293	206	29	48.6	29	7.2	149.18	0.44	9.997 9883	49.5	10	4	59.14
21	294	207	29	29.8	28	48.3	149.27	0.42	9.997 8698	49.2	10	1	3.23
22	295	208	29	13.3	28	31.6	149.36	+0.36	9.997 7521	−48.9	9	57	7.32
23	296	209	28	59.1	28	17.3	149.46	0.27	9.997 6351	48.6	9	53	11.41
24	297	210	28	47.2	28	5.3	149.55	0.16	9.997 5186	48.4	9	49	15.50
25	298	211	28	37.5	27	55.5	149.64	+0.04	9.997 4026	−48.3	9	45	19.59
26	299	212	28	30.0	27	47.9	149.73	−0.10	9.997 2869	48.2	9	41	23.68
27	300	213	28	24.8	27	42.5	149.82	0.24	9.997 1715	48.1	9	37	27.78
28	301	214	28	21.6	27	39.2	149.91	−0.37	9.997 0563	−48.0	9	33	31.87
29	302	215	28	20.4	27	37.9	149.99	0.48	9.996 9413	47.9	9	29	35.96
30	303	216	28	21.2	27	38.5	150.07	0.57	9.996 8264	47.8	9	25	40.05
31	304	217	28	23.8	27	40.9	150.14	0.63	9.996 7118	47.6	9	21	44.14
32	305	218	28	28.1	27	45.1	150.21	−0.67	9.996 5975	−47.4	9	17	48.23

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ′ are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
$-9^{s}.8296$.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	16 36.1	16 31.0	60 49.69	−1.382	60 31.16	−1.698	0 55.6	2.22	1.3
2	16 25.0	16 18.3	60 9.18	1.958	59 44.43	2.159	1 49.9	2.31	2.3
3	16 11.0	16 3.3	59 17.61	2.300	58 49.46	2.381	2 46.6	2.41	3.3
4	15 55.5	15 47.6	58 20.66	−2.411	57 51.82	−2.387	3 45.1	2.46	4.3
5	15 39.9	15 32.5	57 23.53	2.320	56 56.27	2.219	4 44.0	2.43	5.3
6	15 25.4	15 18.8	56 30.40	2.088	56 6.25	1.935	5 41.2	2.32	6.3
7	15 12.8	15 7.3	55 44.04	−1.765	55 23.93	−1.584	6 35.2	2.17	7.3
8	15 2.4	14 58.1	55 6.03	1.397	54 50.38	1.209	7 25.2	2.00	8.3
9	14 54.5	14 51.5	54 37.00	1.021	54 25.86	0.837	8 11.2	1.84	9.3
10	14 49.0	14 47.1	54 16.89	−0.659	54 10.01	−0.490	8 53.8	1.72	10.3
11	14 45.8	14 45.0	54 5.10	0.330	54 2.04	−0.179	9 34.2	1.65	11.3
12	14 44.6	14 44.7	54 0.73	−0.038	54 1.07	+0.094	10 13.2	1.61	12.3
13	14 45.2	14 46.1	54 2.94	+0.215	54 6.20	+0.326	10 52.0	1.62	13.3
14	14 47.3	14 48.9	54 10.74	0.428	54 16.48	0.526	11 31.5	1.68	14.3
15	14 50.8	14 53.0	54 23.37	0.620	54 31.36	0.710	12 12.8	1.77	15.3
16	14 55.4	14 58.2	54 40.40	+0.796	54 50.46	+0.881	12 56.9	1.91	16.3
17	15 1.2	15 4.5	55 1.56	0.968	55 13.71	1.056	13 44.5	2.06	17.3
18	15 8.1	15 12.0	55 26.92	1.145	55 41.20	1.236	14 35.9	2.22	18.3
19	15 16.2	15 20.7	55 56.59	+1.328	56 13.09	+1.421	15 30.8	2.34	19.3
20	15 25.5	15 30.6	56 30.69	1.513	56 49.37	1.599	16 27.9	2.40	20.3
21	15 35.9	15 41.5	57 9.04	1.679	57 29.60	1.747	17 25.4	2.38	21.3
22	15 47.3	15 53.3	57 50.90	+1.800	58 12.71	+1.832	18 21.8	2.31	22.3
23	15 59.3	16 5.3	58 34.75	1.837	58 56.68	1.811	19 16.0	2.21	23.3
24	16 11.1	16 16.6	59 18.08	1.748	59 38.47	1.642	20 7.9	2.12	24.3
25	16 21.8	16 26.4	59 57.32	+1.490	60 14.05	+1.294	20 58.3	2.09	25.3
26	16 30.2	16 33.2	60 28.18	1.055	60 39.21	0.772	21 48.4	2.10	26.3
27	16 35.2	16 36.2	60 46.56	+0.452	60 49.95	+0.108	22 39.4	2.16	27.3
28	16 35.9	16 34.5	60 49.11	−0.250	60 43.93	−0.613	23 32.5	2.28	28.3
29	16 31.9	16 28.2	60 34.45	0.964	60 20.89	1.291	6	. .	29.3
30	16 23.5	16 17.9	60 3.60	1.582	59 43.09	1.829	0 28.7	2.41	0.9
31	16 11.6	16 4.7	59 19.88	2.030	58 54.60	2.174	1 27.7	2.50	1.9
32	15 57.4	15 50.0	58 27.94	−2.262	58 0.51	−2.301	2 28.3	2.53	2.9

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 1.					FRIDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	13 32 3.80	2.3012	S.12 37 30.7	16.426	0	15 26 34.53	2.4705	S.23 33 28.4	10.313
1	13 34 21.96	2.3043	12 53 53.6	16.337	1	15 29 2.85	2.4736	23 43 42.3	10.152
2	13 36 40.31	2.3074	13 10 11.2	16.248	2	15 31 31.36	2.4766	23 53 46.6	9.990
3	13 38 58.85	2.3107	13 26 23.4	16.157	3	15 34 0.04	2.4795	24 3 41.1	9.827
4	13 41 17.59	2.3139	13 42 30.0	16.063	4	15 36 28.90	2.4824	24 13 25.8	9.663
5	13 43 36.52	2.3172	13 58 30.9	15.967	5	15 38 57.93	2.4852	24 23 0.7	9.498
6	13 45 55.66	2.3206	14 14 26.0	15.869	6	15 41 27.12	2.4878	24 32 25.6	9.332
7	13 48 14.99	2.3239	14 30 15.2	15.770	7	15 43 56.47	2.4905	24 41 40.5	9.165
8	13 50 34.53	2.3273	14 45 58.4	15.669	8	15 46 25.98	2.4931	24 50 45.4	8.998
9	13 52 54.27	2.3308	15 1 35.5	15.567	9	15 48 55.64	2.4956	24 59 40.3	8.830
10	13 55 14.22	2.3343	15 17 6.4	15.462	10	15 51 25.45	2.4980	25 8 25.0	8.660
11	13 57 34.39	2.3378	15 32 30.9	15.355	11	15 53 55.40	2.5003	25 16 59.5	8.491
12	13 59 54.76	2.3413	15 47 49.0	15.247	12	15 56 25.49	2.5026	25 25 23.9	8.321
13	14 2 15.35	2.3449	16 3 0.5	15.137	13	15 58 55.71	2.5047	25 33 38.0	8.149
14	14 4 36.15	2.3485	16 18 5.4	15.025	14	16 1 26.06	2.5068	25 41 41.8	7.977
15	14 6 57.17	2.3521	16 33 3.5	14.911	15	16 3 56.53	2.5088	25 49 35.3	7.805
16	14 9 18.40	2.3557	16 47 54.7	14.796	16	16 6 27.11	2.5106	25 57 18.4	7.632
17	14 11 39.85	2.3594	17 2 39.0	14.679	17	16 8 57.80	2.5124	26 4 51.1	7.458
18	14 14 1.53	2.3631	17 17 16.2	14.560	18	16 11 28.60	2.5141	26 12 13.4	7.284
19	14 16 23.43	2.3668	17 31 46.2	14.440	19	16 13 59.49	2.5157	26 19 25.2	7.109
20	14 18 45.55	2.3705	17 46 9.0	14.318	20	16 16 30.48	2.5172	26 26 26.5	6.934
21	14 21 7.89	2.3742	18 0 24.4	14.195	21	16 19 1.55	2.5185	26 33 17.3	6.758
22	14 23 30.46	2.3780	18 14 32.4	14.070	22	16 21 32.70	2.5197	26 39 57.5	6.583
23	14 25 53.25	2.3817	S.18 28 32.8	13.943	23	16 24 3.92	2.5209	S.26 46 27.2	6.407
	THURSDAY 2.					SATURDAY 4.			
0	14 28 16.27	2.3855	S.18 42 25.6	13.815	0	16 26 35.21	2.5220	S.26 52 46.3	6.230
1	14 30 39.51	2.3892	18 56 10.6	13.684	1	16 29 6.56	2.5229	26 58 54.8	6.053
2	14 33 2.98	2.3930	19 9 47.7	13.552	2	16 31 37.96	2.5237	27 4 52.6	5.875
3	14 35 26.67	2.3967	19 23 16.9	13.420	3	16 34 9.40	2.5243	27 10 39.8	5.697
4	14 37 50.59	2.4005	19 36 38.1	13.286	4	16 36 40.88	2.5250	27 16 16.3	5.519
5	14 40 14.73	2.4042	19 49 51.2	13.150	5	16 39 12.40	2.5255	27 21 42.1	5.341
6	14 42 39.10	2.4080	20 2 56.1	13.012	6	16 41 43.94	2.5258	27 26 57.2	5.163
7	14 45 3.69	2.4117	20 15 52.7	12.873	7	16 44 15.50	2.5261	27 32 1.6	4.985
8	14 47 28.50	2.4153	20 28 40.9	12.733	8	16 46 47.07	2.5262	27 36 55.4	4.807
9	14 49 53.53	2.4191	20 41 20.7	12.592	9	16 49 18.64	2.5262	27 41 38.4	4.628
10	14 52 18.79	2.4228	20 53 51.9	12.448	10	16 51 50.21	2.5261	27 46 10.7	4.449
11	14 54 44.26	2.4264	21 6 14.5	12.304	11	16 54 21.77	2.5258	27 50 32.3	4.270
12	14 57 9.96	2.4301	21 18 28.4	12.158	12	16 56 53.31	2.5254	27 54 43.1	4.091
13	14 59 35.87	2.4336	21 30 33.5	12.011	13	16 59 24.82	2.5249	27 58 43.2	3.913
14	15 2 1.99	2.4372	21 42 29.7	11.862	14	17 1 56.30	2.5243	28 2 32.7	3.735
15	15 4 28.33	2.4407	21 54 17.0	11.713	15	17 4 27.74	2.5236	28 6 11.4	3.556
16	15 6 54.88	2.4442	22 5 55.3	11.562	16	17 6 59.13	2.5227	28 9 39.4	3.378
17	15 9 21.63	2.4476	22 17 24.5	11.410	17	17 9 30.46	2.5216	28 12 56.7	3.200
18	15 11 48.59	2.4510	22 28 44.5	11.257	18	17 12 1.73	2.5205	28 16 3.4	3.022
19	15 14 15.75	2.4544	22 39 55.3	11.103	19	17 14 32.92	2.5192	28 18 59.4	2.844
20	15 16 43.12	2.4577	22 50 56.8	10.947	20	17 17 4.03	2.5178	28 21 44.7	2.667
21	15 19 10.68	2.4610	23 1 48.9	10.790	21	17 19 35.06	2.5164	28 24 19.4	2.489
22	15 21 38.44	2.4642	23 12 31.6	10.632	22	17 22 6.00	2.5148	28 26 43.4	2.313
23	15 24 6.39	2.4674	23 23 4.8	10.473	23	17 24 36.83	2.5130	28 28 56.9	2.137
24	15 26 34.53	2.4705	S.23 33 28.4	10.313	24	17 27 7.56	2.5112	S.28 30 59.8	1.960

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 5.					TUESDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	17 27 7.56	2.5112	S. 28 30 59.8	1.960	0	19 23 21.85	2.2975	S. 26 54 54.9	5.617
1	17 29 38.17	2.5091	28 32 52.1	1.784	1	19 25 39.51	2.2913	26 49 13.9	5.750
2	17 32 8.65	2.5069	28 34 33.9	1.609	2	19 27 56.80	2.2851	26 43 24.9	5.882
3	17 34 39.00	2.5047	28 36 5.2	1.435	3	19 30 13.72	2.2788	26 37 28.0	6.013
4	17 37 9.21	2.5023	28 37 26.0	1.260	4	19 32 30.25	2.2724	26 31 23.4	6.142
5	17 39 39.27	2.4998	28 38 36.4	1.086	5	19 34 46.41	2.2661	26 25 11.0	6.270
6	17 42 9.18	2.4972	28 39 36.4	0.913	6	19 37 2.18	2.2597	26 18 50.9	6.397
7	17 44 38.93	2.4944	28 40 26.0	0.741	7	19 39 17.57	2.2533	26 12 23.3	6.523
8	17 47 8.51	2.4916	28 41 5.3	0.568	8	19 41 32.58	2.2469	26 5 48.2	6.648
9	17 49 37.92	2.4886	28 41 34.2	0.396	9	19 43 47.20	2.2405	25 59 5.6	6.772
10	17 52 7.14	2.4854	28 41 52.8	0.225	10	19 46 1.44	2.2341	25 52 15.6	6.894
11	17 54 36.17	2.4822	28 42 1.2	−0.055	11	19 48 15.29	2.2276	25 45 18.3	7.015
12	17 57 5.01	2.4789	28 41 59.4	+0.114	12	19 50 28.75	2.2211	25 38 13.8	7.135
13	17 59 33.64	2.4754	28 41 47.5	0.282	13	19 52 41.82	2.2146	25 31 2.1	7.253
14	18 2 2.06	2.4718	28 41 25.5	0.451	14	19 54 54.50	2.2082	25 23 43.4	7.371
15	18 4 30.26	2.4682	28 40 53.4	0.619	15	19 57 6.80	2.2017	25 16 17.6	7.488
16	18 6 58.24	2.4644	28 40 11.2	0.786	16	19 59 18.70	2.1952	25 8 44.9	7.603
17	18 9 25.99	2.4605	28 39 19.1	0.952	17	20 1 30.22	2.1887	25 1 5.3	7.717
18	18 11 53.50	2.4565	28 38 17.0	1.117	18	20 3 41.34	2.1822	24 53 18.9	7.829
19	18 14 20.77	2.4524	28 37 5.1	1.281	19	20 5 52.08	2.1757	24 45 25.8	7.941
20	18 16 47.79	2.4482	28 35 43.3	1.444	20	20 8 2.42	2.1692	24 37 26.0	8.052
21	18 19 14.55	2.4439	28 34 11.8	1.607	21	20 10 12.38	2.1627	24 29 19.6	8.161
22	18 21 41.06	2.4396	28 32 30.5	1.769	22	20 12 21.95	2.1563	24 21 6.7	8.269
23	18 24 7.30	2.4350	S. 28 30 39.5	1.930	23	20 14 31.13	2.1498	S. 24 12 47.3	8.377
	MONDAY 6.					WEDNESDAY 8.			
0	18 26 33.26	2.4303	S. 28 28 38.9	2.089	0	20 16 39.93	2.1434	S. 24 4 21.5	8.483
1	18 28 58.94	2.4257	28 26 28.8	2.248	1	20 18 48.34	2.1369	23 55 49.4	8.587
2	18 31 24.34	2.4209	28 24 9.1	2.407	2	20 20 56.36	2.1305	23 47 11.1	8.689
3	18 33 49.45	2.4161	28 21 40.0	2.563	3	20 23 4.00	2.1242	23 38 26.7	8.792
4	18 36 14.27	2.4111	28 19 1.5	2.720	4	20 25 11.26	2.1178	23 29 36.1	8.893
5	18 38 38.78	2.4060	28 16 13.6	2.875	5	20 27 18.14	2.1114	23 20 39.5	8.993
6	18 41 2.99	2.4009	28 13 16.5	3.028	6	20 29 24.63	2.1051	23 11 36.9	9.092
7	18 43 26.89	2.3957	28 10 10.2	3.182	7	20 31 30.75	2.0988	23 2 28.5	9.189
8	18 45 50.48	2.3905	28 6 54.7	3.334	8	20 33 36.49	2.0925	22 53 14.2	9.287
9	18 48 13.75	2.3851	28 3 30.1	3.485	9	20 35 41.85	2.0862	22 43 54.1	9.383
10	18 50 36.69	2.3797	27 59 56.5	3.635	10	20 37 46.84	2.0800	22 34 28.3	9.477
11	18 52 59.31	2.3742	27 56 13.9	3.784	11	20 39 51.45	2.0738	22 24 56.9	9.569
12	18 55 21.60	2.3687	27 52 22.4	3.932	12	20 41 55.70	2.0677	22 15 20.0	9.661
13	18 57 43.55	2.3630	27 48 22.1	4.078	13	20 43 59.57	2.0615	22 5 37.6	9.752
14	19 0 5.16	2.3573	27 44 13.0	4.223	14	20 46 3.08	2.0555	21 55 49.8	9.842
15	19 2 26.43	2.3516	27 39 55.3	4.368	15	20 48 6.23	2.0494	21 45 56.6	9.931
16	19 4 47.35	2.3457	27 35 28.9	4.512	16	20 50 9.01	2.0433	21 35 58.1	10.018
17	19 7 7.91	2.3398	27 30 53.9	4.653	17	20 52 11.43	2.0373	21 25 54.4	10.104
18	19 9 28.13	2.3340	27 26 10.5	4.794	18	20 54 13.49	2.0314	21 15 45.6	10.190
19	19 11 47.99	2.3280	27 21 18.6	4.935	19	20 56 15.20	2.0255	21 5 31.6	10.275
20	19 14 7.49	2.3220	27 16 18.3	5.074	20	20 58 16.55	2.0196	20 55 12.6	10.358
21	19 16 26.63	2.3159	27 11 9.7	5.212	21	21 0 17.55	2.0138	20 44 48.7	10.440
22	19 18 45.40	2.3098	27 5 52.9	5.348	22	21 2 18.20	2.0080	20 34 19.8	10.522
23	19 21 3.81	2.3037	27 0 27.9	5.483	23	21 4 18.51	2.0023	20 23 46.1	10.608
24	19 23 21.85	2.2975	S. 26 54 54.9	5.617	24	21 6 18.48	1.9966	S. 20 13 7.6	10.681

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THURSDAY 9.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	21 6 18.48	1.9966	S. 20 13 7.6	10.681
1	21 8 18.10	1.9909	20 2 24.4	10.759
2	21 10 17.39	1.9854	19 51 36.5	10.836
3	21 12 16.35	1.9798	19 40 44.1	10.912
4	21 14 14.97	1.9743	19 29 47.1	10.988
5	21 16 13.27	1.9689	19 18 45.6	11.062
6	21 18 11.24	1.9635	19 7 39.7	11.134
7	21 20 8.89	1.9581	18 56 29.5	11.206
8	21 22 6.21	1.9528	18 45 15.0	11.278
9	21 24 3.22	1.9476	18 33 56.2	11.348
10	21 25 59.92	1.9424	18 22 33.3	11.417
11	21 27 56.31	1.9373	18 11 6.2	11.485
12	21 29 52.39	1.9322	17 59 35.1	11.552
13	21 31 48.17	1.9272	17 48 0.0	11.618
14	21 33 43.65	1.9222	17 36 20.9	11.683
15	21 35 38.83	1.9173	17 24 37.9	11.748
16	21 37 33.72	1.9125	17 12 51.1	11.812
17	21 39 28.32	1.9077	17 1 0.5	11.874
18	21 41 22.64	1.9029	16 49 6.2	11.935
19	21 43 16.68	1.8982	16 37 8.3	11.996
20	21 45 10.43	1.8936	16 25 6.7	12.056
21	21 47 3.91	1.8891	16 13 1.6	12.115
22	21 48 57.12	1.8846	16 0 52.9	12.173
23	21 50 50.06	1.8802	S. 15 48 40.8	12.229

FRIDAY 10.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	21 52 42.74	1.8758	S. 15 36 25.4	12.285
1	21 54 35.16	1.8715	15 24 6.6	12.341
2	21 56 27.32	1.8673	15 11 44.5	12.395
3	21 58 19.23	1.8631	14 59 19.2	12.448
4	22 0 10.89	1.8589	14 46 50.7	12.501
5	22 2 2.30	1.8548	14 34 19.1	12.553
6	22 3 53.47	1.8508	14 21 44.4	12.604
7	22 5 44.40	1.8469	14 9 6.6	12.654
8	22 7 35.10	1.8431	13 56 25.9	12.703
9	22 9 25.57	1.8393	13 43 42.2	12.752
10	22 11 15.81	1.8355	13 30 55.7	12.798
11	22 13 5.83	1.8319	13 18 6.4	12.845
12	22 14 55.64	1.8283	13 5 14.3	12.891
13	22 16 45.23	1.8248	12 52 19.5	12.936
14	22 18 34.61	1.8213	12 39 22.0	12.981
15	22 20 23.78	1.8178	12 26 21.8	13.024
16	22 22 12.75	1.8146	12 13 19.1	13.066
17	22 24 1.53	1.8113	12 0 13.9	13.108
18	22 25 50.11	1.8081	11 47 6.2	13.149
19	22 27 38.50	1.8049	11 33 56.0	13.189
20	22 29 26.70	1.8018	11 20 43.5	13.228
21	22 31 14.72	1.7988	11 7 28.7	13.267
22	22 33 2.56	1.7958	10 54 11.5	13.305
23	22 34 50.22	1.7930	10 40 52.1	13.342
24	22 36 37.72	1.7902	S. 10 27 30.5	13.378

SATURDAY 11.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	22 36 37.72	1.7902	S. 10 27 30.5	13.378
1	22 38 25.05	1.7874	10 14 6.8	13.413
2	22 40 12.21	1.7847	10 0 41.0	13.448
3	22 41 59.22	1.7822	9 47 13.1	13.482
4	22 43 46.08	1.7797	9 33 43.2	13.514
5	22 45 32.78	1.7772	9 20 11.4	13.547
6	22 47 19.34	1.7748	9 6 37.6	13.578
7	22 49 5.75	1.7724	8 53 2.0	13.609
8	22 50 52.03	1.7702	8 39 24.5	13.639
9	22 52 38.17	1.7680	8 25 45.3	13.668
10	22 54 24.19	1.7659	8 12 4.3	13.697
11	22 56 10.08	1.7638	7 58 21.6	13.725
12	22 57 55.85	1.7618	7 44 37.3	13.752
13	22 59 41.50	1.7599	7 30 51.4	13.778
14	23 1 27.04	1.7581	7 17 4.0	13.803
15	23 3 12.47	1.7563	7 3 15.0	13.828
16	23 4 57.79	1.7545	6 49 24.6	13.852
17	23 6 43.01	1.7528	6 35 32.7	13.876
18	23 8 28.13	1.7513	6 21 39.5	13.898
19	23 10 13.16	1.7498	6 7 45.0	13.919
20	23 11 58.11	1.7484	5 53 49.2	13.941
21	23 13 42.97	1.7470	5 39 52.1	13.962
22	23 15 27.75	1.7457	5 25 53.8	13.981
23	23 17 12.45	1.7444	S. 5 11 54.4	13.999

SUNDAY 12.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	23 18 57.08	1.7433	S. 4 57 53.9	14.017
1	23 20 41.64	1.7422	4 43 52.3	14.035
2	23 22 26.14	1.7412	4 29 49.7	14.052
3	23 24 10.58	1.7402	4 15 46.1	14.068
4	23 25 54.96	1.7393	4 1 41.6	14.083
5	23 27 39.29	1.7384	3 47 36.2	14.098
6	23 29 23.57	1.7377	3 33 29.9	14.112
7	23 31 7.81	1.7370	3 19 22.8	14.124
8	23 32 52.01	1.7363	3 5 15.0	14.136
9	23 34 36.17	1.7357	2 51 6.5	14.148
10	23 36 20.30	1.7353	2 36 57.3	14.159
11	23 38 4.40	1.7349	2 22 47.4	14.169
12	23 39 48.49	1.7346	2 8 37.0	14.178
13	23 41 32.55	1.7343	1 54 26.0	14.187
14	23 43 16.60	1.7341	1 40 14.6	14.194
15	23 45 0.64	1.7339	1 26 2.7	14.202
16	23 46 44.67	1.7338	1 11 50.4	14.208
17	23 48 28.70	1.7338	0 57 37.7	14.213
18	23 50 12.73	1.7339	0 43 24.8	14.218
19	23 51 56.77	1.7341	0 29 11.5	14.223
20	23 53 40.82	1.7343	0 14 58.0	14.226
21	23 55 24.88	1.7345	S. 0 0 44.4	14.228
22	23 57 8.96	1.7348	N. 0 13 29.4	14.231
23	23 58 53.06	1.7352	0 27 43.3	14.232
24	0 0 37.19	1.7358	N. 0 41 57.2	14.232

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 13.					WEDNESDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	0 0 37.19	1.7358	N. 0 41 57.2	14.232	0	1 25 45.49	1.8372	N.11 50 47.2	13.318
1	0 2 21.35	1.7363	0 56 11.1	14.232	1	1 27 35.83	1.8409	12 4 5.1	13.279
2	0 4 5.54	1.7368	1 10 25.0	14.231	2	1 29 26.40	1.8447	12 17 20.6	13.238
3	0 5 49.77	1.7375	1 24 38.8	14.229	3	1 31 17.19	1.8485	12 30 33.7	13.196
4	0 7 34.04	1.7383	1 38 52.5	14.227	4	1 33 8.21	1.8523	12 43 44.2	13.153
5	0 9 18.36	1.7392	1 53 6.0	14.223	5	1 34 59.47	1.8563	12 56 52.1	13.109
6	0 11 2.74	1.7400	2 7 19.3	14.219	6	1 36 50.97	1.8603	13 9 57.3	13.064
7	0 12 47.16	1.7408	2 21 32.3	14.215	7	1 38 42.71	1.8644	13 22 59.8	13.018
8	0 14 31.64	1.7419	2 35 45.1	14.210	8	1 40 34.70	1.8686	13 35 59.5	12.972
9	0 16 16.19	1.7430	2 49 57.5	14.203	9	1 42 26.94	1.8728	13 48 56.4	12.924
10	0 18 0.80	1.7442	3 4 9.4	14.195	10	1 44 19.43	1.8770	14 1 50.4	12.875
11	0 19 45.49	1.7454	3 18 20.9	14.187	11	1 46 12.18	1.8813	14 14 41.4	12.825
12	0 21 30.25	1.7467	3 32 31.9	14.178	12	1 48 5.19	1.8857	14 27 29.4	12.774
13	0 23 15.09	1.7480	3 46 42.3	14.169	13	1 49 58.46	1.8901	14 40 14.3	12.722
14	0 25 0.01	1.7494	4 0 52.2	14.159	14	1 51 52.00	1.8946	14 52 56.1	12.670
15	0 26 45.02	1.7509	4 15 1.4	14.148	15	1 53 45.81	1.8991	15 5 34.7	12.616
16	0 28 30.12	1.7525	4 29 10.0	14.137	16	1 55 39.89	1.9037	15 18 10.0	12.562
17	0 30 15.32	1.7542	4 43 17.8	14.123	17	1 57 34.25	1.9083	15 30 42.0	12.506
18	0 32 0.62	1.7558	4 57 24.8	14.110	18	1 59 28.89	1.9130	15 43 10.6	12.448
19	0 33 46.02	1.7575	5 11 31.0	14.096	19	2 1 23.81	1.9178	15 55 35.8	12.390
20	0 35 31.52	1.7593	5 25 36.3	14.081	20	2 3 19.02	1.9226	16 7 57.5	12.332
21	0 37 17.14	1.7612	5 39 40.7	14.065	21	2 5 14.52	1.9274	16 20 15.6	12.272
22	0 39 2.87	1.7632	5 53 44.1	14.048	22	2 7 10.31	1.9323	16 32 30.1	12.211
23	0 40 48.73	1.7653	N. 6 7 46.5	14.031	23	2 9 6.40	1.9372	N.16 44 40.9	12.149
	TUESDAY 14.					THURSDAY 16.			
0	0 42 34.71	1.7674	N. 6 21 47.8	14.012	0	2 11 2.78	1.9422	N.16 56 48.0	12.086
1	0 44 20.82	1.7696	6 35 48.0	13.993	1	2 12 59.47	1.9473	17 8 51.2	12.022
2	0 46 7.06	1.7718	6 49 47.0	13.974	2	2 14 56.46	1.9524	17 20 50.5	11.956
3	0 47 53.43	1.7740	7 3 44.9	13.954	3	2 16 53.76	1.9576	17 32 45.9	11.889
4	0 49 39.94	1.7764	7 17 41.5	13.932	4	2 18 51.37	1.9628	17 44 37.3	11.822
5	0 51 26.60	1.7788	7 31 36.7	13.909	5	2 20 49.29	1.9680	17 56 24.6	11.754
6	0 53 13.40	1.7813	7 45 30.6	13.886	6	2 22 47.53	1.9733	18 8 7.8	11.684
7	0 55 0.35	1.7838	7 59 23.0	13.862	7	2 24 46.09	1.9787	18 19 46.7	11.613
8	0 56 47.46	1.7865	8 13 14.0	13.837	8	2 26 44.97	1.9841	18 31 21.4	11.542
9	0 58 34.73	1.7892	8 27 3.4	13.811	9	2 28 44.18	1.9895	18 42 51.7	11.468
10	1 0 22.16	1.7919	8 40 51.3	13.785	10	2 30 43.71	1.9949	18 54 17.6	11.395
11	1 2 9.76	1.7947	8 54 37.6	13.757	11	2 32 43.57	2.0004	19 5 39.1	11.320
12	1 3 57.53	1.7976	9 8 22.2	13.728	12	2 34 43.76	2.0060	19 16 56.0	11.243
13	1 5 45.47	1.8006	9 22 5.0	13.699	13	2 36 44.29	2.0116	19 28 8.3	11.166
14	1 7 33.60	1.8036	9 35 46.1	13.669	14	2 38 45.15	2.0172	19 39 15.9	11.087
15	1 9 21.90	1.8066	9 49 25.3	13.638	15	2 40 46.35	2.0228	19 50 18.7	11.007
16	1 11 10.39	1.8097	10 3 2.7	13.607	16	2 42 47.89	2.0285	20 1 16.7	10.927
17	1 12 59.07	1.8130	10 16 38.1	13.573	17	2 44 49.77	2.0342	20 12 9.9	10.845
18	1 14 47.95	1.8163	10 30 11.5	13.540	18	2 46 52.00	2.0400	20 22 58.1	10.762
19	1 16 37.02	1.8196	10 43 42.9	13.506	19	2 48 54.57	2.0458	20 33 41.3	10.677
20	1 18 26.30	1.8230	10 57 12.2	13.470	20	2 50 57.49	2.0516	20 44 19.3	10.591
21	1 20 15.78	1.8264	11 10 39.3	13.433	21	2 53 0.76	2.0574	20 54 52.2	10.505
22	1 22 5.47	1.8299	11 24 4.2	13.397	22	2 55 4.38	2.0633	21 5 19.9	10.417
23	1 23 55.37	1.8335	11 37 26.9	13.358	23	2 57 8.36	2.0692	21 15 42.3	10.328
24	1 25 45.49	1.8372	N.11 50 47.2	13.318	24	2 59 12.69	2.0752	N.21 25 59.3	10.237

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 17.					SUNDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	2 59 12.69	2.0752	N.21 25 59.3	10.237	0	4 45 42.26	2.3540	N.27 31 3.5	4.529
1	3 1 17.38	2.0811	21 36 10.8	10.147	1	4 48 3.65	2.3589	27 35 30.9	4.383
2	3 3 22.42	2.0871	21 46 16.8	10.054	2	4 50 25.33	2.3637	27 39 49.5	4.236
3	3 5 27.83	2.0931	21 56 17.3	9.960	3	4 52 47.29	2.3683	27 43 59.2	4.088
4	3 7 33.59	2.0990	22 6 12.1	9.866	4	4 55 9.53	2.3730	27 48 0.0	3.939
5	3 9 39.71	2.1051	22 16 1.2	9.770	5	4 57 32.05	2.3776	27 51 51.9	3.790
6	3 11 46.20	2.1112	22 25 44.5	9.672	6	4 59 54.84	2.3820	27 55 34.8	3.639
7	3 13 53.05	2.1172	22 35 21.9	9.573	7	5 2 17.89	2.3863	27 59 8.6	3.487
8	3 16 0.26	2.1233	22 44 53.3	9.473	8	5 4 41.20	2.3907	28 2 33.2	3.334
9	3 18 7.84	2.1293	22 54 18.7	9.373	9	5 7 4.77	2.3949	28 5 48.7	3.182
10	3 20 15.78	2.1354	23 3 38.1	9.272	10	5 9 28.59	2.3990	28 8 55.0	3.028
11	3 22 24.09	2.1415	23 12 51.3	9.168	11	5 11 52.65	2.4030	28 11 52.0	2.873
12	3 24 32.76	2.1476	23 21 58.3	9.064	12	5 14 16.95	2.4069	28 14 39.7	2.717
13	3 26 41.80	2.1537	23 30 59.0	8.958	13	5 16 41.48	2.4107	28 17 18.0	2.560
14	3 28 51.21	2.1598	23 39 53.3	8.851	14	5 19 6.24	2.4145	28 19 46.9	2.402
15	3 31 0.98	2.1659	23 48 41.1	8.742	15	5 21 31.22	2.4182	28 22 6.3	2.244
16	3 33 11.12	2.1720	23 57 22.4	8.633	16	5 23 56.42	2.4217	28 24 16.2	2.086
17	3 35 21.62	2.1781	24 5 57.1	8.523	17	5 26 21.82	2.4251	28 26 16.6	1.927
18	3 37 32.49	2.1842	24 14 25.2	8.412	18	5 28 47.43	2.4284	28 28 7.4	1.767
19	3 39 43.73	2.1903	24 22 46.6	8.299	19	5 31 13.23	2.4317	28 29 48.6	1.605
20	3 41 55.33	2.1963	24 31 1.1	8.185	20	5 33 39.22	2.4348	28 31 20.1	1.443
21	3 44 7.29	2.2024	24 39 8.7	8.069	21	5 36 5.40	2.4378	28 32 41.9	1.282
22	3 46 19.62	2.2085	24 47 9.4	7.954	22	5 38 31.76	2.4407	28 33 53.9	1.119
23	3 48 32.31	2.2146	N.24 55 3.2	7.837	23	5 40 58.29	2.4435	N.28 34 56.1	0.956
	SATURDAY 18.					MONDAY 20.			
0	3 50 45.37	2.2207	N.25 2 49.8	7.718	0	5 43 24.98	2.4462	N.28 35 48.6	0.793
1	3 52 58.79	2.2266	25 10 29.3	7.598	1	5 45 51.83	2.4487	28 36 31.2	0.628
2	3 55 12.56	2.2325	25 18 1.5	7.476	2	5 48 18.82	2.4511	28 37 3.9	0.462
3	3 57 26.69	2.2385	25 25 26.4	7.354	3	5 50 45.96	2.4535	28 37 26.7	0.297
4	3 59 41.18	2.2444	25 32 44.0	7.231	4	5 53 13.24	2.4557	28 37 39.6	+0.132
5	4 1 56.02	2.2503	25 39 54.1	7.107	5	5 55 40.65	2.4578	28 37 42.5	−0.034
6	4 4 11.22	2.2563	25 46 56.7	6.980	6	5 58 8.18	2.4598	28 37 35.5	0.201
7	4 6 26.77	2.2621	25 53 51.7	6.853	7	6 0 35.83	2.4617	28 37 18.4	0.368
8	4 8 42.67	2.2678	26 0 39.1	6.726	8	6 3 3.58	2.4634	28 36 51.3	0.535
9	4 10 58.91	2.2736	26 7 18.8	6.597	9	6 5 31.44	2.4651	28 36 14.2	0.703
10	4 13 15.50	2.2793	26 13 50.7	6.467	10	6 7 59.39	2.4666	28 35 26.9	0.872
11	4 15 32.43	2.2849	26 20 14.8	6.336	11	6 10 27.43	2.4680	28 34 29.6	1.039
12	4 17 49.69	2.2905	26 26 31.0	6.203	12	6 12 55.55	2.4692	28 33 22.2	1.208
13	4 20 7.29	2.2962	26 32 39.1	6.068	13	6 15 23.74	2.4704	28 32 4.6	1.377
14	4 22 25.23	2.3018	26 38 39.2	5.934	14	6 17 52.00	2.4715	28 30 37.0	1.546
15	4 24 43.50	2.3073	26 44 31.2	5.798	15	6 20 20.32	2.4724	28 28 59.1	1.716
16	4 27 2.10	2.3127	26 50 15.0	5.662	16	6 22 48.69	2.4732	28 27 11.1	1.884
17	4 29 21.02	2.3180	26 55 50.6	5.524	17	6 25 17.10	2.4738	28 25 13.0	2.053
18	4 31 40.26	2.3233	27 1 17.9	5.385	18	6 27 45.55	2.4744	28 23 4.7	2.223
19	4 33 59.82	2.3286	27 6 36.8	5.244	19	6 30 14.03	2.4748	28 20 46.2	2.393
20	4 36 19.69	2.3338	27 11 47.2	5.103	20	6 32 42.53	2.4752	28 18 17.5	2.563
21	4 38 39.88	2.3390	27 16 49.2	4.962	21	6 35 11.05	2.4754	28 15 38.6	2.732
22	4 41 0.37	2.3441	27 21 42.6	4.818	22	6 37 39.58	2.4755	28 12 49.5	2.903
23	4 43 21.17	2.3491	27 26 27.4	4.674	23	6 40 8.11	2.4755	28 9 50.2	3.073
24	4 45 42.26	2.3540	N.27 31 3.5	4.529	24	6 42 36.64	2.4753	N.28 6 40.8	3.243

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 21.					THURSDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	6 42 36.64	2.4753	N.28 6 40.8	3.243	0	8 39 25.91	2.3641	N.22 22 2.3	10.877
1	6 45 5.15	2.4751	28 3 21.1	3.413	1	8 41 47.64	2.3604	22 11 5.5	11.017
2	6 47 33.65	2.4748	27 59 51.3	3.582	2	8 44 9.16	2.3568	22 0 0.3	11.156
3	6 50 2.12	2.4743	27 56 11.3	3.752	3	8 46 30.46	2.3531	21 48 46.8	11.293
4	6 52 30.56	2.4737	27 52 21.1	3.921	4	8 48 51.53	2.3494	21 37 25.1	11.429
5	6 54 58.96	2.4729	27 48 20.8	4.090	5	8 51 12.39	2.3457	21 25 55.3	11.565
6	6 57 27.31	2.4722	27 44 10.3	4.259	6	8 53 33.02	2.3420	21 14 17.3	11.700
7	6 59 55.62	2.4713	27 39 49.7	4.428	7	8 55 53.43	2.3383	21 2 31.3	11.833
8	7 2 23.87	2.4703	27 35 18.9	4.597	8	8 58 13.62	2.3346	20 50 37.4	11.964
9	7 4 52.06	2.4692	27 30 38.1	4.765	9	9 0 33.58	2.3308	20 38 35.6	12.095
10	7 7 20.17	2.4679	27 25 47.1	4.933	10	9 2 53.32	2.3272	20 26 26.0	12.224
11	7 9 48.21	2.4666	27 20 46.1	5.100	11	9 5 12.84	2.3235	20 14 8.7	12.352
12	7 12 16.16	2.4651	27 15 35.1	5.268	12	9 7 32.14	2.3198	20 1 43.7	12.480
13	7 14 44.02	2.4636	27 10 14.0	5.435	13	9 9 51.22	2.3162	19 49 11.1	12.606
14	7 17 11.79	2.4620	27 4 42.9	5.602	14	9 12 10.08	2.3125	19 36 31.0	12.730
15	7 19 39.46	2.4603	26 59 1.8	5.768	15	9 14 28.72	2.3088	19 23 43.5	12.853
16	7 22 7.03	2.4585	26 53 10.8	5.933	16	9 16 47.14	2.3052	19 10 48.6	12.976
17	7 24 34.48	2.4566	26 47 9.8	6.098	17	9 19 5.34	2.3016	18 57 46.4	13.097
18	7 27 1.82	2.4546	26 40 59.0	6.262	18	9 21 23.33	2.2980	18 44 37.0	13.216
19	7 29 29.03	2.4525	26 34 38.3	6.428	19	9 23 41.10	2.2944	18 31 20.5	13.334
20	7 31 56.12	2.4504	26 28 7.7	6.592	20	9 25 58.66	2.2908	18 17 56.9	13.452
21	7 34 23.08	2.4481	26 21 27.3	6.754	21	9 28 16.00	2.2873	18 4 26.3	13.568
22	7 36 49.89	2.4458	26 14 37.2	6.917	22	9 30 33.14	2.2838	17 50 48.8	13.682
23	7 39 16.57	2.4434	N.26 7 37.3	7.079	23	9 32 50.06	2.2803	N.17 37 4.5	13.794
	WEDNESDAY 22.					FRIDAY 24.			
0	7 41 43.10	2.4408	N.26 0 27.7	7.241	0	9 35 6.78	2.2770	N.17 23 13.5	13.906
1	7 44 9.47	2.4383	25 53 8.4	7.402	1	9 37 23.30	2.2736	17 9 15.8	14.017
2	7 46 35.69	2.4357	25 45 39.5	7.562	2	9 39 39.61	2.2702	16 55 11.5	14.125
3	7 49 1.75	2.4330	25 38 1.0	7.721	3	9 41 55.72	2.2668	16 41 0.8	14.232
4	7 51 27.65	2.4302	25 30 13.0	7.880	4	9 44 11.63	2.2636	16 26 43.6	14.339
5	7 53 53.37	2.4273	25 22 15.4	8.038	5	9 46 27.35	2.2603	16 12 20.1	14.444
6	7 56 18.93	2.4245	25 14 8.4	8.195	6	9 48 42.87	2.2571	15 57 50.3	14.547
7	7 58 44.31	2.4215	25 5 52.0	8.352	7	9 50 58.20	2.2539	15 43 14.4	14.649
8	8 1 9.51	2.4185	24 57 26.2	8.508	8	9 53 13.34	2.2508	15 28 32.4	14.750
9	8 3 34.53	2.4154	24 48 51.1	8.663	9	9 55 28.29	2.2477	15 13 44.4	14.849
10	8 5 59.36	2.4123	24 40 6.7	8.817	10	9 57 43.07	2.2447	14 58 50.5	14.947
11	8 8 24.00	2.4091	24 31 13.1	8.969	11	9 59 57.66	2.2417	14 43 50.8	15.043
12	8 10 48.45	2.4058	24 22 10.4	9.122	12	10 2 12.07	2.2388	14 28 45.3	15.138
13	8 13 12.70	2.4025	24 12 58.5	9.273	13	10 4 26.31	2.2359	14 13 34.2	15.232
14	8 15 36.75	2.3992	24 3 37.6	9.423	14	10 6 40.38	2.2331	13 58 17.5	15.323
15	8 18 0.61	2.3959	23 54 7.7	9.573	15	10 8 54.28	2.2303	13 42 55.4	15.413
16	8 20 24.26	2.3924	23 44 28.8	9.722	16	10 11 8.02	2.2277	13 27 27.9	15.502
17	8 22 47.70	2.3890	23 34 41.0	9.870	17	10 13 21.60	2.2250	13 11 55.1	15.590
18	8 25 10.94	2.3856	23 24 44.4	10.017	18	10 15 35.02	2.2223	12 56 17.1	15.676
19	8 27 33.97	2.3821	23 14 39.0	10.163	19	10 17 48.28	2.2198	12 40 34.0	15.760
20	8 29 56.79	2.3785	23 4 24.9	10.308	20	10 20 1.40	2.2174	12 24 45.9	15.843
21	8 32 19.39	2.3749	22 54 2.1	10.452	21	10 22 14.37	2.2150	12 8 52.8	15.925
22	8 34 41.78	2.3713	22 43 30.7	10.595	22	10 24 27.20	2.2127	11 52 54.9	16.005
23	8 37 3.95	2.3677	22 32 50.7	10.737	23	10 26 39.89	2.2103	11 36 52.2	16.083
24	8 39 25.91	2.3641	N.22 22 2.3	10.877	24	10 28 52.44	2.2081	N.11 20 44.9	16.159

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 25.					MONDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	10 28 52.44	2.2081	N. 11 20 44.9	16.159	0	12 13 45.22	2.1932	S. 2 31 40.5	17.848
1	10 31 4.86	2.2060	11 4 33.1	16.234	1	12 15 56.86	2.1949	2 49 31.1	17.838
2	10 33 17.16	2.2039	10 48 16.8	16.308	2	12 18 8.61	2.1968	3 7 21.1	17.827
3	10 35 29.33	2.2019	10 31 56.1	16.380	3	12 20 20.48	2.1987	3 25 10.3	17.812
4	10 37 41.39	2.2000	10 15 31.2	16.450	4	12 22 32.46	2.2007	3 42 58.6	17.797
5	10 39 53.33	2.1981	9 59 2.1	16.519	5	12 24 44.56	2.2027	4 0 46.0	17.781
6	10 42 5.16	2.1963	9 42 28.9	16.586	6	12 26 56.78	2.2048	4 18 32.3	17.762
7	10 44 16.89	2.1947	9 25 51.8	16.652	7	12 29 9.14	2.2071	4 36 17.4	17.740
8	10 46 28.52	2.1930	9 9 10.8	16.716	8	12 31 21.63	2.2094	4 54 1.1	17.716
9	10 48 40.05	2.1914	8 52 25.9	16.778	9	12 33 34.27	2.2118	5 11 43.3	17.691
10	10 50 51.49	2.1899	8 35 37.3	16.839	10	12 35 47.05	2.2143	5 29 24.0	17.664
11	10 53 2.84	2.1884	8 18 45.2	16.898	11	12 37 59.98	2.2168	5 47 3.0	17.635
12	10 55 14.10	2.1871	8 1 49.6	16.955	12	12 40 13.07	2.2195	6 4 40.2	17.604
13	10 57 25.29	2.1858	7 44 50.6	17.011	13	12 42 26.32	2.2222	6 22 15.5	17.571
14	10 59 36.40	2.1846	7 27 48.3	17.065	14	12 44 39.73	2.2250	6 39 48.7	17.535
15	11 1 47.44	2.1835	7 10 42.8	17.117	15	12 46 53.31	2.2278	6 57 19.7	17.497
16	11 3 58.42	2.1825	6 53 34.3	17.168	16	12 49 7.07	2.2307	7 14 48.4	17.458
17	11 6 9.34	2.1815	6 36 22.8	17.217	17	12 51 21.01	2.2338	7 32 14.7	17.417
18	11 8 20.20	2.1806	6 19 8.3	17.264	18	12 53 35.13	2.2369	7 49 38.5	17.374
19	11 10 31.01	2.1798	6 1 51.0	17.310	19	12 55 49.44	2.2401	8 6 59.6	17.328
20	11 12 41.78	2.1792	5 44 31.1	17.353	20	12 58 3.94	2.2433	8 24 17.9	17.281
21	11 14 52.51	2.1785	5 27 8.6	17.395	21	13 0 18.64	2.2467	8 41 33.3	17.232
22	11 17 3.20	2.1779	5 9 43.6	17.436	22	13 2 33.54	2.2500	8 58 45.7	17.180
23	11 19 13.86	2.1775	N. 4 52 16.3	17.475	23	13 4 48.64	2.2534	S. 9 15 54.9	17.127
	SUNDAY 26.					TUESDAY 28.			
0	11 21 24.50	2.1771	N. 4 34 46.7	17.512	0	13 7 3.95	2.2569	S. 9 33 0.9	17.071
1	11 23 35.11	2.1768	4 17 14.9	17.547	1	13 9 19.47	2.2605	9 50 3.5	17.013
2	11 25 45.71	2.1766	3 59 41.1	17.579	2	13 11 35.21	2.2642	10 7 2.5	16.954
3	11 27 56.30	2.1765	3 42 5.4	17.611	3	13 13 51.17	2.2679	10 23 57.9	16.892
4	11 30 6.89	2.1764	3 24 27.8	17.641	4	13 16 7.36	2.2717	10 40 49.6	16.828
5	11 32 17.47	2.1764	3 6 48.5	17.668	5	13 18 23.78	2.2756	10 57 37.4	16.762
6	11 34 28.06	2.1766	2 49 7.6	17.695	6	13 20 40.43	2.2794	11 14 21.1	16.695
7	11 36 38.66	2.1768	2 31 25.2	17.719	7	13 22 57.31	2.2834	11 31 0.7	16.625
8	11 38 49.27	2.1770	2 13 41.3	17.742	8	13 25 14.44	2.2875	11 47 36.1	16.553
9	11 40 59.90	2.1773	1 55 56.1	17.763	9	13 27 31.81	2.2915	12 4 7.1	16.479
10	11 43 10.55	2.1778	1 38 9.8	17.781	10	13 29 49.42	2.2956	12 20 33.6	16.403
11	11 45 21.24	2.1784	1 20 22.4	17.798	11	13 32 7.28	2.2998	12 36 55.5	16.326
12	11 47 31.96	2.1790	1 2 34.0	17.813	12	13 34 25.40	2.3041	12 53 12.7	16.246
13	11 49 42.72	2.1798	0 44 44.8	17.827	13	13 36 43.77	2.3083	13 9 25.0	16.163
14	11 51 53.53	2.1806	0 26 54.8	17.838	14	13 39 2.40	2.3127	13 25 32.3	16.080
15	11 54 4.39	2.1814	N. 0 9 4.2	17.847	15	13 41 21.29	2.3170	13 41 34.6	15.994
16	11 56 15.30	2.1823	S. 0 8 46.8	17.854	16	13 43 40.44	2.3214	13 57 31.6	15.906
17	11 58 26.27	2.1834	0 26 38.3	17.861	17	13 45 59.86	2.3260	14 13 23.3	15.816
18	12 0 37.31	2.1846	0 44 30.1	17.865	18	13 48 19.56	2.3305	14 29 9.5	15.723
19	12 2 48.42	2.1858	1 2 22.1	17.867	19	13 50 39.52	2.3350	14 44 50.1	15.629
20	12 4 59.61	2.1872	1 20 14.1	17.867	20	13 52 59.76	2.3397	15 0 25.0	15.533
21	12 7 10.88	2.1885	1 38 6.1	17.865	21	13 55 20.28	2.3442	15 15 54.1	15.436
22	12 9 22.23	2.1900	1 55 57.9	17.861	22	13 57 41.07	2.3488	15 31 17.3	15.336
23	12 11 33.68	2.1916	2 13 49.4	17.855	23	14 0 2.14	2.3536	15 46 34.4	15.233
24	12 13 45.22	2.1932	S. 2 31 40.5	17.848	24	14 2 23.50	2.3583	S. 16 1 45.3	15.129

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 29.			
	h m s	s	° ′ ″	″
0	14 2 23.50	2.3583	S. 16 1 45.3	15.129
1	14 4 45.14	2.3631	16 16 49.9	15.024
2	14 7 7.07	2.3678	16 31 48.2	14.917
3	14 9 29.28	2.3726	16 46 39.9	14.807
4	14 11 51.78	2.3774	17 1 25.0	14.695
5	14 14 14.57	2.3823	17 16 3.3	14.581
6	14 16 37.65	2.3871	17 30 34.7	14.466
7	14 19 1.02	2.3919	17 44 59.2	14.348
8	14 21 24.68	2.3968	17 59 16.6	14.230
9	14 23 48.63	2.4017	18 13 26.8	14.109
10	14 26 12.88	2.4066	18 27 29.7	13.986
11	14 28 37.42	2.4114	18 41 25.1	13.861
12	14 31 2.25	2.4163	18 55 13.0	13.734
13	14 33 27.37	2.4211	19 8 53.2	13.606
14	14 35 52.78	2.4260	19 22 25.7	13.476
15	14 38 18.49	2.4309	19 35 50.3	13.343
16	14 40 44.49	2.4357	19 49 6.9	13.209
17	14 43 10.77	2.4405	20 2 15.4	13.074
18	14 45 37.35	2.4453	20 15 15.8	12.937
19	14 48 4.21	2.4501	20 28 7.9	12.798
20	14 50 31.36	2.4548	20 40 51.6	12.657
21	14 52 58.79	2.4595	20 53 26.8	12.515
22	14 55 26.50	2.4642	21 5 53.4	12.372
23	14 57 54.50	2.4689	S. 21 18 11.4	12.227
	THURSDAY 30.			
0	15 0 22.77	2.4735	S. 21 30 20.6	12.079
1	15 2 51.32	2.4781	21 42 20.9	11.930
2	15 5 20.14	2.4827	21 54 12.2	11.780
3	15 7 49.24	2.4872	22 5 54.5	11.629
4	15 10 18.60	2.4916	22 17 27.7	11.476
5	15 12 48.23	2.4961	22 28 51.6	11.320
6	15 15 18.13	2.5004	22 40 6.1	11.164
7	15 17 48.28	2.5046	22 51 11.2	11.007
8	15 20 18.68	2.5088	23 2 6.9	10.848
9	15 22 49.34	2.5130	23 12 53.0	10.688
10	15 25 20.24	2.5170	23 23 29.4	10.526
11	15 27 51.38	2.5211	23 33 56.1	10.363
12	15 30 22.77	2.5251	23 44 12.9	10.198
13	15 32 54.39	2.5289	23 54 19.8	10.032
14	15 35 26.24	2.5327	24 4 16.8	9.866
15	15 37 58.31	2.5363	24 14 3.7	9.698
16	15 40 30.60	2.5399	24 23 40.5	9.528
17	15 43 3.10	2.5435	24 33 7.1	9.358
18	15 45 35.82	2.5469	24 42 23.5	9.187
19	15 48 8.73	2.5502	24 51 29.5	9.014
20	15 50 41.84	2.5534	25 0 25.2	8.841
21	15 53 15.14	2.5566	25 9 10.4	8.667
22	15 55 48.63	2.5596	25 17 45.1	8.491
23	15 58 22.29	2.5624	25 26 9.3	8.314
24	16 0 56.12	2.5652	S. 25 34 22.9	8.137

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 31.			
	h m s	s	° ′ ″	″
0	16 0 56.12	2.5652	S. 25 34 22.9	8.137
1	16 3 30.12	2.5679	25 42 25.8	7.959
2	16 6 4.27	2.5705	25 50 18.0	7.780
3	16 8 38.58	2.5730	25 57 59.4	7.600
4	16 11 13.03	2.5753	26 5 30.0	7.419
5	16 13 47.61	2.5774	26 12 49.7	7.238
6	16 16 22.32	2.5795	26 19 58.5	7.057
7	16 18 57.15	2.5815	26 26 56.4	6.873
8	16 21 32.10	2.5833	26 33 43.4	6.691
9	16 24 7.15	2.5850	26 40 19.4	6.508
10	16 26 42.30	2.5866	26 46 44.3	6.323
11	16 29 17.54	2.5880	26 52 58.1	6.138
12	16 31 52.86	2.5892	26 59 0.9	5.953
13	16 34 28.25	2.5904	27 4 52.5	5.768
14	16 37 3.71	2.5914	27 10 33.0	5.582
15	16 39 39.22	2.5922	27 16 2.3	5.395
16	16 42 14.78	2.5929	27 21 20.4	5.208
17	16 44 50.37	2.5934	27 26 27.3	5.021
18	16 47 25.99	2.5939	27 31 23.0	4.834
19	16 50 1.64	2.5942	27 36 7.4	4.647
20	16 52 37.29	2.5943	27 40 40.6	4.459
21	16 55 12.95	2.5943	27 45 2.5	4.272
22	16 57 48.60	2.5941	27 49 13.2	4.084
23	17 0 24.24	2.5937	S. 27 53 12.6	3.897
	SATURDAY, NOVEMBER 1.			
0	17 2 59.85	2.5932	S. 27 57 0.8	3.709

PHASES OF THE MOON.

			d	h	m
☽	First Quarter . .	Oct.	6	13	46.2
○	Full Moon		14	18	6.9
☾	Last Quarter		22	10	53.0
●	New Moon		29	2	29.2

			d	h
☾	Apogee	Oct.	12	3.2
☾	Perigee		27	15.9

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.	Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Sat.	1	14 24 18.56	9.786	S.14 19 53.2	−48.32	16 9.07	66.86	16 18.90	0.070
SUN.	2	14 28 13.84	9.819	14 39 5.8	47.72	16 9.33	66.97	16 20.18	0.037
Mon.	3	14 32 9.90	9.852	14 58 4.1	47.11	16 9.58	67.08	16 20.67	0.003
Tues.	4	14 36 6.76	9.886	15 16 47.6	−46.49	16 9.83	67.20	16 20.37	0.030
Wed.	5	14 40 4.42	9.920	15 35 16.0	45.86	16 10.07	67.32	16 19.27	0.063
Thur.	6	14 44 2.90	9.954	15 53 28.9	45.21	16 10.32	67.44	16 17.35	0.097
Fri.	7	14 48 2.19	9.988	16 11 25.8	−44.53	16 10.56	67.56	16 14.61	0.131
Sat.	8	14 52 2.31	10.022	16 29 6.3	43.84	16 10.80	67.68	16 11.05	0.166
SUN.	9	14 56 3.27	10.057	16 46 30.2	43.14	16 11.04	67.80	16 6.67	0.201
Mon.	10	15 0 5.06	10.092	17 3 37.0	−42.42	16 11.27	67.92	16 1.46	0.236
Tues.	11	15 4 7.69	10.127	17 20 26.3	41.68	16 11.50	68.04	15 55.41	0.270
Wed.	12	15 8 11.15	10.162	17 36 57.7	40.92	16 11.73	68.16	15 48.52	0.305
Thur.	13	15 12 15.46	10.197	17 53 10.8	−40.15	16 11.95	68.28	15 40.78	0.340
Fri.	14	15 16 20.62	10.233	18 9 5.3	39.37	16 12.17	68.40	15 32.20	0.376
Sat.	15	15 20 26.63	10.268	18 24 40.8	38.58	16 12.39	68.52	15 22.77	0.411
SUN.	16	15 24 33.50	10.303	18 39 56.8	−37.76	16 12.60	68.64	15 12.49	0.446
Mon.	17	15 28 41.22	10.339	18 54 53.1	36.93	16 12.80	68.76	15 1.36	0.482
Tues.	18	15 32 49.79	10.374	19 9 29.3	36.08	16 13.00	68.88	14 49.38	0.517
Wed.	19	15 36 59.21	10.409	19 23 45.0	−35.22	16 13.20	68.99	14 36.55	0.552
Thur.	20	15 41 9.48	10.445	19 37 39.7	34.34	16 13.39	69.10	14 22.88	0.587
Fri.	21	15 45 20.58	10.480	19 51 13.2	33.44	16 13.58	69.21	14 8.37	0.622
Sat.	22	15 49 32.52	10.514	20 4 25.1	−32.53	16 13.76	69.32	13 53.04	0.656
SUN.	23	15 53 45.27	10.548	20 17 15.0	31.61	16 13.94	69.43	13 36.89	0.690
Mon.	24	15 57 58.83	10.581	20 29 42.5	30.67	16 14.12	69.53	13 19.93	0.723
Tues.	25	16 2 13.19	10.614	20 41 47.3	−29.72	16 14.30	69.63	13 2.18	0.756
Wed.	26	16 6 28.32	10.646	20 53 28.9	28.75	16 14.47	69.74	12 43.66	0.787
Thur.	27	16 10 44.21	10.677	21 4 47.0	27.76	16 14.64	69.84	12 24.39	0.818
Fri.	28	16 15 0.83	10.707	21 15 41.3	−26.76	16 14.81	69.94	12 4.38	0.848
Sat.	29	16 19 18.16	10.736	21 26 11.5	25.75	16 14.98	70.04	11 43.66	0.877
SUN.	30	16 23 36.17	10.764	21 36 17.2	24.72	16 15.14	70.13	11 22.26	0.905
Mon.	31	16 27 54.85	10.791	S.21 45 58.2	−23.68	16 15.30	70.22	11 0.20	0.932

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0s.18 from the sidereal time.

The sign − prefixed to the hourly change of declination indicates that south declinations are increasing.

NOVEMBER, 1913.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	THE SUN'S Diff. for 1 Hour.	THE SUN'S Apparent Declination.	THE SUN'S Diff. for 1 Hour.	Equation of Time to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ′ ″	″	m s	s	h m s
Sat.	1	14 24 21.23	9.787	S. 14 20 6.3	−48.31	16 18.92	0.070	14 40 40.14
SUN.	2	14 28 16.51	9.820	14 39 18.8	47.72	16 20.19	0.037	14 44 36.70
Mon.	3	14 32 12.58	9.853	14 58 16.9	47.11	16 20.67	0.003	14 48 33.25
Tues.	4	14 36 9.45	9.886	15 17 0.3	−46.49	16 20.36	0.030	14 52 29.81
Wed.	5	14 40 7.12	9.920	15 35 28.5	45.85	16 19.24	0.063	14 56 26.36
Thur.	6	14 44 5.60	9.954	15 53 41.2	45.20	16 17.31	0.097	15 0 22.92
Fri.	7	14 48 4.90	9.988	16 11 37.9	−44.52	16 14.57	0.131	15 4 19.48
Sat.	8	14 52 5.02	10.022	16 29 18.2	43.83	16 11.01	0.166	15 8 16.03
SUN.	9	14 56 5.97	10.057	16 46 41.8	43.13	16 6.62	0.201	15 12 12.59
Mon.	10	15 0 7.75	10.092	17 3 48.3	−42.41	16 1.40	0.236	15 16 9.15
Tues.	11	15 4 10.37	10.127	17 20 37.3	41.67	15 55.34	0.270	15 20 5.70
Wed.	12	15 8 13.82	10.162	17 37 8.4	40.91	15 48.44	0.305	15 24 2.26
Thur.	13	15 12 18.12	10.197	17 53 21.2	−40.14	15 40.69	0.340	15 27 58.82
Fri.	14	15 16 23.27	10.232	18 9 15.4	39.36	15 32.10	0.376	15 31 55.37
Sat.	15	15 20 29.27	10.267	18 24 50.6	38.56	15 22.66	0.411	15 35 51.93
SUN.	16	15 24 36.12	10.303	18 40 6.3	−37.74	15 12.38	0.446	15 39 48.49
Mon.	17	15 28 43.81	10.339	18 55 2.3	36.91	15 1.24	0.482	15 43 45.04
Tues.	18	15 32 52.35	10.374	19 9 38.2	36.07	14 49.25	0.517	15 47 41.60
Wed.	19	15 37 1.74	10.409	19 23 53.5	−35.21	14 36.42	0.552	15 51 38.16
Thur.	20	15 41 11.98	10.444	19 37 47.9	34.33	14 22.74	0.587	15 55 34.72
Fri.	21	15 45 23.05	10.479	19 51 21.1	33.43	14 8.23	0.622	15 59 31.28
Sat.	22	15 49 34.95	10.513	20 4 32.6	−32.52	13 52.89	0.656	16 3 27.83
SUN.	23	15 53 47.66	10.547	20 17 22.2	31.60	13 36.73	0.690	16 7 24.39
Mon.	24	15 58 1.18	10.580	20 29 49.3	30.66	13 19.77	0.723	16 11 20.95
Tues.	25	16 2 15.49	10.612	20 41 53.7	−29.70	13 2.01	0.756	16 15 17.51
Wed.	26	16 6 30.57	10.644	20 53 35.0	28.73	12 43.49	0.787	16 19 14.06
Thur.	27	16 10 46.41	10.675	21 4 52.8	27.75	12 24.22	0.818	16 23 10.62
Fri.	28	16 15 2.98	10.705	21 15 46.7	−26.75	12 4.21	0.848	16 27 7.18
Sat.	29	16 19 20.25	10.734	21 26 16.5	25.73	11 43.49	0.877	16 31 3.74
SUN.	30	16 23 38.20	10.762	21 36 21.9	24.71	11 22.09	0.905	16 35 0.30
Mon.	31	16 27 56.82	10.789	S. 21 46 2.5	−23.67	11 0.03	0.932	16 38 56.86

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign − prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 Hour.
$+9^s.8565$.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S True Longitude. λ	THE SUN'S True Longitude. λ′	THE SUN'S Diff. for 1 Hour.	THE SUN'S Latitude.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		° ′ ″	′ ″	″	″			h m s
1	305	218 28 28.1	27 45.1	150.21	−0.67	9.996 5975	−47.4	9 17 48.23
2	306	219 28 34.1	27 51.0	150.28	0.67	9.996 4837	47.2	9 13 52.32
3	307	220 28 41.8	27 58.5	150.34	0.64	9.996 3705	46.9	9 9 56.41
4	308	221 28 51.0	28 7.5	150.41	−0.60	9.996 2580	−46.6	9 6 0.50
5	309	222 29 1.7	28 18.1	150.48	0.52	9.996 1465	46.2	9 2 4.59
6	310	223 29 13.9	28 30.2	150.55	0.42	9.996 0361	45.7	8 58 8.68
7	311	224 29 27.7	28 43.8	150.61	−0.31	9.995 9269	−45.2	8 54 12.77
8	312	225 29 43.0	28 58.9	150.67	0.19	9.995 8191	44.6	8 50 16.86
9	313	226 29 59.8	29 15.6	150.73	−0.06	9.995 7128	44.0	8 46 20.94
10	314	227 30 18.2	29 33.8	150.79	+0.06	9.995 6081	−43.3	8 42 25.03
11	315	228 30 38.1	29 53.5	150.86	0.17	9.995 5050	42.6	8 38 29.12
12	316	229 30 59.5	30 14.8	150.93	0.28	9.995 4037	41.8	8 34 33.21
13	317	230 31 22.5	30 37.7	150.99	+0.38	9.995 3043	−41.0	8 30 37.30
14	318	231 31 47.1	31 2.2	151.06	0.45	9.995 2069	40.2	8 26 41.39
15	319	232 32 13.4	31 28.3	151.13	0.49	9.995 1115	39.3	8 22 45.48
16	320	233 32 41.4	31 56.1	151.20	+0.50	9.995 0181	−38.5	8 18 49.57
17	321	234 33 11.1	32 25.6	151.28	0.48	9.994 9266	37.7	8 14 53.66
18	322	235 33 42.6	32 56.9	151.35	0.43	9.994 8371	36.9	8 10 57.75
19	323	236 34 15.8	33 29.9	151.42	+0.35	9.994 7495	−36.1	8 7 1.83
20	324	237 34 50.8	34 4.7	151.49	0.25	9.994 6637	35.4	8 3 5.92
21	325	238 35 27.5	34 41.3	151.57	+0.14	9.994 5796	34.7	7 59 10.01
22	326	239 36 6.0	35 19.6	151.64	0.00	9.994 4971	−34.1	7 55 14.10
23	327	240 36 46.3	35 59.7	151.71	−0.13	9.994 4161	33.5	7 51 18.19
24	328	241 37 28.2	36 41.5	151.78	0.26	9.994 3365	32.9	7 47 22.27
25	329	242 38 11.7	37 24.8	151.85	−0.38	9.994 2581	−32.4	7 43 26.36
26	330	243 38 56.7	38 9.6	151.91	0.48	9.994 1809	31.9	7 39 30.45
27	331	244 39 43.2	38 55.9	151.96	0.55	9.994 1048	31.5	7 35 34.54
28	332	245 40 31.0	39 43.5	152.02	−0.59	9.994 0299	−31.0	7 31 38.63
29	333	246 41 20.0	40 32.3	152.07	0.59	9.993 9561	30.5	7 27 42.71
30	334	247 42 10.1	41 22.2	152.11	0.56	9.993 8836	30.0	7 23 46.80
31	335	248 43 1.3	42 13.2	152.15	−0.51	9.993 8123	−29.4	7 19 50.89

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ′ are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
−9ˢ.8296.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 57.4	15 50.0	58 27.94	−2.262	58 0.51	−2.301	2 28.3	2.53	2.9
2	15 42.4	15 35.0	57 32.92	2.290	57 5.76	2.231	3 28.3	2.45	3.9
3	15 27.9	15 21.1	56 39.54	2.133	56 14.68	2.006	4 25.5	2.30	4.9
4	15 14.8	15 9.0	55 51.50	−1.854	55 30.30	−1.677	5 18.3	2.10	5.9
5	15 3.8	14 59.3	55 11.32	1.484	54 54.71	1.282	6 6.5	1.92	6.9
6	14 55.5	14 52.3	54 40.58	1.073	54 28.96	0.863	6 50.8	1.77	7.9
7	14 49.8	14 48.0	54 19.86	−0.653	54 13.25	−0.449	7 32.0	1.67	8.9
8	14 46.9	14 46.4	54 9.07	−0.250	54 7.21	−0.061	8 11.5	1.62	9.9
9	14 46.5	14 47.1	54 7.55	+0.115	54 9.94	+0.280	8 50.2	1.61	10.9
10	14 48.3	14 50.0	54 14.24	+0.433	54 20.26	+0.569	9 29.4	1.66	11.9
11	14 52.0	14 54.4	54 27.82	0.690	54 36.75	0.796	10 10.1	1.75	12.9
12	14 57.2	15 0.2	54 46.86	0.886	54 57.97	0.963	10 53.5	1.88	13.9
13	15 3.5	15 6.9	55 9.92	+1.026	55 22.56	+1.077	11 40.4	2.04	14.9
14	15 10.5	15 14.2	55 35.74	1.118	55 49.35	1.149	12 31.3	2.20	15.9
15	15 18.0	15 21.9	56 3.29	1.173	56 17.48	1.191	13 25.8	2.34	16.9
16	15 25.8	15 29.8	56 31.85	+1.203	56 46.36	+1.214	14 23.0	2.41	17.9
17	15 33.7	15 37.8	57 1.00	1.224	57 15.74	1.231	15 20.8	2.39	18.9
18	15 41.8	15 45.8	57 30.55	1.236	57 45.40	1.238	16 17.3	2.31	19.9
19	15 49.9	15 53.9	58 0.26	+1.236	58 15.05	+1.227	17 11.3	2.19	20.9
20	15 57.9	16 1.8	58 29.69	1.208	58 44.02	1.177	18 2.5	2.08	21.9
21	16 5.6	16 9.2	58 57.85	1.126	59 10.98	1.058	18 51.6	2.02	22.9
22	16 12.5	16 15.5	59 23.15	+0.966	59 34.06	+0.848	19 39.8	2.01	23.9
23	16 18.0	16 20.0	59 43.39	0.702	59 50.79	0.526	20 28.4	2.06	24.9
24	16 21.4	16 22.1	59 55.92	+0.325	59 58.50	+0.101	21 18.9	2.16	25.9
25	16 22.1	16 21.2	59 58.26	−0.143	59 55.01	−0.399	22 12.3	2.30	26.9
26	16 19.4	16 16.8	59 48.66	0.659	59 39.20	0.915	23 9.3	2.44	27.9
27	16 13.4	16 9.3	59 26.73	1.160	59 11.43	1.385	6	. .	28.9
28	16 4.4	15 59.0	58 53.61	−1.580	58 33.64	−1.741	0 9.3	2.54	0.4
29	15 53.1	15 46.8	58 11.98	1.863	57 49.09	1.944	1 10.5	2.54	1.4
30	15 40.4	15 33.9	57 25.49	1.983	57 1.67	1.980	2 10.3	2.43	2.4
31	15 27.5	15 21.3	56 38.12	1.938	56 15.29	1.859	3 6.5	2.24	3.4
32	15 15.4	15 9.9	55 53.60	−1.749	55 33.41	−1.610	3 57.8	2.04	4.4

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 1.					MONDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	17 2 59.85	2.5932	S.27 57 0.8	3.709	0	19 4 7.48	2.4049	S.27 27 42.8	4.611
1	17 5 35.42	2.5925	28 0 37.7	3.522	1	19 6 31.58	2.3983	27 23 1.7	4.759
2	17 8 10.95	2.5917	28 4 3.4	3.334	2	19 8 55.28	2.3917	27 18 11.7	4.907
3	17 10 46.43	2.5907	28 7 17.8	3.147	3	19 11 18.58	2.3850	27 13 12.9	5.053
4	17 13 21.85	2.5897	28 10 21.0	2.960	4	19 13 41.48	2.3783	27 8 5.4	5.197
5	17 15 57.19	2.5884	28 13 13.0	2.773	5	19 16 3.97	2.3715	27 2 49.3	5.339
6	17 18 32.45	2.5869	28 15 53.7	2.586	6	19 18 26.06	2.3647	26 57 24.7	5.481
7	17 21 7.62	2.5853	28 18 23.3	2.400	7	19 20 47.73	2.3577	26 51 51.6	5.622
8	17 23 42.69	2.5837	28 20 41.7	2.214	8	19 23 8.98	2.3507	26 46 10.1	5.761
9	17 26 17.66	2.5818	28 22 49.0	2.028	9	19 25 29.82	2.3438	26 40 20.3	5.898
10	17 28 52.51	2.5798	28 24 45.1	1.842	10	19 27 50.24	2.3368	26 34 22.3	6.034
11	17 31 27.24	2.5777	28 26 30.1	1.657	11	19 30 10.23	2.3297	26 28 16.2	6.169
12	17 34 1.83	2.5753	28 28 4.0	1.472	12	19 32 29.80	2.3226	26 22 2.0	6.303
13	17 36 36.27	2.5728	28 29 26.8	1.289	13	19 34 48.94	2.3154	26 15 39.8	6.435
14	17 39 10.56	2.5702	28 30 38.7	1.107	14	19 37 7.65	2.3083	26 9 9.8	6.565
15	17 41 44.69	2.5673	28 31 39.6	0.923	15	19 39 25.94	2.3012	26 2 32.0	6.694
16	17 44 18.64	2.5643	28 32 29.5	0.741	16	19 41 43.79	2.2939	25 55 46.5	6.822
17	17 46 52.41	2.5613	28 33 8.5	0.559	17	19 44 1.21	2.2867	25 48 53.3	6.949
18	17 49 26.00	2.5582	28 33 36.6	0.378	18	19 46 18.20	2.2795	25 41 52.6	7.074
19	17 51 59.39	2.5548	28 33 53.9	0.198	19	19 48 34.75	2.2722	25 34 44.4	7.198
20	17 54 32.57	2.5513	28 34 0.4	−0.018	20	19 50 50.86	2.2649	25 27 28.8	7.320
21	17 57 5.54	2.5477	28 33 56.1	+0.161	21	19 53 6.54	2.2577	25 20 6.0	7.441
22	17 59 38.29	2.5439	28 33 41.1	0.338	22	19 55 21.78	2.2504	25 12 35.9	7.562
23	18 2 10.81	2.5400	S.28 33 15.5	0.515	23	19 57 36.59	2.2432	S.25 4 58.6	7.680
	SUNDAY 2.					TUESDAY 4.			
0	18 4 43.09	2.5359	S.28 32 39.3	0.692	0	19 59 50.96	2.2358	S.24 57 14.3	7.797
1	18 7 15.12	2.5317	28 31 52.5	0.867	1	20 2 4.89	2.2285	24 49 23.0	7.912
2	18 9 46.90	2.5274	28 30 55.2	1.042	2	20 4 18.38	2.2212	24 41 24.9	8.026
3	18 12 18.41	2.5229	28 29 47.5	1.215	3	20 6 31.44	2.2140	24 33 19.9	8.139
4	18 14 49.65	2.5184	28 28 29.4	1.388	4	20 8 44.06	2.2067	24 25 8.2	8.250
5	18 17 20.62	2.5137	28 27 0.9	1.560	5	20 10 56.24	2.1994	24 16 49.8	8.361
6	18 19 51.30	2.5089	28 25 22.2	1.730	6	20 13 7.99	2.1922	24 8 24.9	8.470
7	18 22 21.69	2.5040	28 23 33.3	1.900	7	20 15 19.31	2.1851	23 59 53.5	8.578
8	18 24 51.78	2.4990	28 21 34.2	2.069	8	20 17 30.20	2.1778	23 51 15.6	8.684
9	18 27 21.57	2.4938	28 19 25.0	2.237	9	20 19 40.65	2.1706	23 42 31.4	8.788
10	18 29 51.04	2.4885	28 17 5.8	2.403	10	20 21 50.67	2.1634	23 33 41.0	8.892
11	18 32 20.19	2.4832	28 14 36.6	2.569	11	20 24 0.26	2.1562	23 24 44.4	8.995
12	18 34 49.02	2.4777	28 11 57.5	2.733	12	20 26 9.42	2.1491	23 15 41.6	9.097
13	18 37 17.51	2.4721	28 9 8.6	2.896	13	20 28 18.15	2.1420	23 6 32.8	9.196
14	18 39 45.67	2.4664	28 6 10.0	3.058	14	20 30 26.46	2.1350	22 57 18.1	9.293
15	18 42 13.48	2.4607	28 3 1.7	3.219	15	20 32 34.35	2.1280	22 47 57.6	9.391
16	18 44 40.95	2.4548	27 59 43.7	3.378	16	20 34 41.82	2.1210	22 38 31.2	9.487
17	18 47 8.06	2.4488	27 56 16.2	3.537	17	20 36 48.87	2.1140	22 28 59.1	9.582
18	18 49 34.81	2.4428	27 52 39.2	3.694	18	20 38 55.50	2.1071	22 19 21.4	9.675
19	18 52 1.20	2.4367	27 48 52.9	3.850	19	20 41 1.72	2.1002	22 9 38.1	9.767
20	18 54 27.21	2.4304	27 44 57.2	4.005	20	20 43 7.52	2.0933	21 59 49.4	9.858
21	18 56 52.85	2.4242	27 40 52.3	4.158	21	20 45 12.92	2.0866	21 49 55.2	9.948
22	18 59 18.11	2.4178	27 36 38.2	4.311	22	20 47 17.91	2.0798	21 39 55.6	10.037
23	19 1 42.99	2.4114	27 32 15.0	4.462	23	20 49 22.49	2.0730	21 29 50.8	10.123
24	19 4 7.48	2.4049	S.27 27 42.8	4.611	24	20 51 26.67	2.0663	S.21 19 40.8	10.209

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

WEDNESDAY 5.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	20 51 26.67	2.0663	S. 21 19 40.8	10.209
1	20 53 30.45	2.0597	21 9 25.7	10.294
2	20 55 33.83	2.0530	20 59 5.5	10.377
3	20 57 36.81	2.0465	20 48 40.4	10.460
4	20 59 39.41	2.0401	20 38 10.3	10.542
5	21 1 41.62	2.0336	20 27 35.4	10.622
6	21 3 43.44	2.0272	20 16 55.7	10.701
7	21 5 44.88	2.0208	20 6 11.3	10.778
8	21 7 45.94	2.0146	19 55 22.3	10.855
9	21 9 46.63	2.0084	19 44 28.7	10.931
10	21 11 46.95	2.0022	19 33 30.6	11.006
11	21 13 46.89	1.9960	19 22 28.0	11.079
12	21 15 46.47	1.9900	19 11 21.1	11.151
13	21 17 45.69	1.9840	19 0 9.9	11.222
14	21 19 44.55	1.9781	18 48 54.4	11.293
15	21 21 43.06	1.9722	18 37 34.7	11.362
16	21 23 41.21	1.9663	18 26 10.9	11.430
17	21 25 39.02	1.9607	18 14 43.1	11.497
18	21 27 36.49	1.9549	18 3 11.2	11.564
19	21 29 33.61	1.9492	17 51 35.4	11.628
20	21 31 30.40	1.9437	17 39 55.8	11.692
21	21 33 26.86	1.9382	17 28 12.3	11.756
22	21 35 22.99	1.9328	17 16 25.1	11.818
23	21 37 18.80	1.9275	S. 17 4 34.2	11.879

THURSDAY 6.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	21 39 14.29	1.9222	S. 16 52 39.6	11.939
1	21 41 9.47	1.9170	16 40 41.5	11.998
2	21 43 4.33	1.9118	16 28 39.8	12.057
3	21 44 58.89	1.9067	16 16 34.7	12.113
4	21 46 53.14	1.9017	16 4 26.2	12.170
5	21 48 47.09	1.8968	15 52 14.3	12.226
6	21 50 40.75	1.8919	15 39 59.1	12.280
7	21 52 34.12	1.8871	15 27 40.7	12.333
8	21 54 27.20	1.8823	15 15 19.1	12.387
9	21 56 20.00	1.8777	15 2 54.3	12.438
10	21 58 12.53	1.8732	14 50 26.5	12.488
11	22 0 4.78	1.8686	14 37 55.7	12.538
12	22 1 56.76	1.8641	14 25 21.9	12.588
13	22 3 48.47	1.8597	14 12 45.2	12.636
14	22 5 39.92	1.8554	14 0 5.6	12.683
15	22 7 31.12	1.8512	13 47 23.2	12.729
16	22 9 22.07	1.8471	13 34 38.1	12.775
17	22 11 12.77	1.8429	13 21 50.2	12.820
18	22 13 3.22	1.8388	13 8 59.7	12.864
19	22 14 53.43	1.8349	12 56 6.5	12.907
20	22 16 43.41	1.8311	12 43 10.8	12.950
21	22 18 33.16	1.8273	12 30 12.5	12.992
22	22 20 22.69	1.8237	12 17 11.8	13.032
23	22 22 12.00	1.8200	12 4 8.7	13.072
24	22 24 1.09	1.8164	S. 11 51 3.2	13.111

FRIDAY 7.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	22 24 1.09	1.8164	S. 11 51 3.2	13.111
1	22 25 49.97	1.8129	11 37 55.4	13.149
2	22 27 38.64	1.8095	11 24 45.3	13.187
3	22 29 27.11	1.8062	11 11 32.9	13.224
4	22 31 15.38	1.8028	10 58 18.4	13.260
5	22 33 3.45	1.7997	10 45 1.7	13.296
6	22 34 51.34	1.7966	10 31 42.9	13.330
7	22 36 39.04	1.7935	10 18 22.1	13.363
8	22 38 26.56	1.7906	10 4 59.3	13.397
9	22 40 13.91	1.7877	9 51 34.5	13.429
10	22 42 1.09	1.7849	9 38 7.8	13.461
11	22 43 48.10	1.7821	9 24 39.2	13.492
12	22 45 34.94	1.7794	9 11 8.8	13.522
13	22 47 21.63	1.7769	8 57 36.6	13.551
14	22 49 8.17	1.7744	8 44 2.7	13.579
15	22 50 54.56	1.7719	8 30 27.1	13.607
16	22 52 40.80	1.7695	8 16 49.9	13.634
17	22 54 26.90	1.7672	8 3 11.0	13.661
18	22 56 12.87	1.7651	7 49 30.6	13.687
19	22 57 58.71	1.7629	7 35 48.6	13.713
20	22 59 44.42	1.7608	7 22 5.1	13.737
21	23 1 30.01	1.7589	7 8 20.2	13.760
22	23 3 15.49	1.7570	6 54 33.9	13.783
23	23 5 0.85	1.7551	S. 6 40 46.3	13.805

SATURDAY 8.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	23 6 46.10	1.7533	S. 6 26 57.3	13.827
1	23 8 31.25	1.7517	6 13 7.1	13.848
2	23 10 16.30	1.7501	5 59 15.6	13.868
3	23 12 1.26	1.7486	5 45 22.9	13.888
4	23 13 46.13	1.7471	5 31 29.1	13.907
5	23 15 30.91	1.7458	5 17 34.1	13.925
6	23 17 15.62	1.7445	5 3 38.1	13.942
7	23 19 0.25	1.7432	4 49 41.1	13.958
8	23 20 44.80	1.7420	4 35 43.1	13.975
9	23 22 29.29	1.7410	4 21 44.1	13.991
10	23 24 13.72	1.7400	4 7 44.2	14.005
11	23 25 58.09	1.7390	3 53 43.5	14.019
12	23 27 42.40	1.7381	3 39 42.0	14.032
13	23 29 26.66	1.7373	3 25 39.7	14.045
14	23 31 10.88	1.7367	3 11 36.6	14.057
15	23 32 55.06	1.7361	2 57 32.8	14.069
16	23 34 39.21	1.7355	2 43 28.3	14.080
17	23 36 23.32	1.7350	2 29 23.2	14.089
18	23 38 7.41	1.7346	2 15 17.6	14.098
19	23 39 51.47	1.7343	2 1 11.4	14.107
20	23 41 35.52	1.7340	1 47 4.7	14.116
21	23 43 19.55	1.7338	1 32 57.5	14.123
22	23 45 3.58	1.7338	1 18 49.9	14.130
23	23 46 47.61	1.7337	1 4 41.9	14.136
24	23 48 31.63	1.7337	S. 0 50 33.6	14.141

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SUNDAY 9.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	23 48 31.63	1.7337	S. 0 50 33.6	14.141
1	23 50 15.65	1.7338	0 36 25.0	14.146
2	23 51 59.69	1.7341	0 22 16.1	14.150
3	23 53 43.74	1.7343	S. 0 8 7.0	14.152
4	23 55 27.81	1.7347	N. 0 6 2.2	14.155
5	23 57 11.90	1.7350	0 20 11.6	14.157
6	23 58 56.01	1.7355	0 34 21.1	14.158
7	0 0 40.16	1.7362	0 48 30.6	14.159
8	0 2 24.35	1.7368	1 2 40.2	14.159
9	0 4 8.57	1.7374	1 16 49.7	14.158
10	0 5 52.84	1.7382	1 30 59.2	14.157
11	0 7 37.16	1.7392	1 45 8.5	14.153
12	0 9 21.54	1.7401	1 59 17.6	14.150
13	0 11 5.97	1.7410	2 13 26.5	14.147
14	0 12 50.46	1.7421	2 27 35.2	14.143
15	0 14 35.02	1.7432	2 41 43.6	14.138
16	0 16 19.65	1.7444	2 55 51.7	14.132
17	0 18 4.35	1.7458	3 9 59.4	14.125
18	0.19 49.14	1.7472	3 24 6.7	14.117
19	0 21 34.01	1.7486	3 38 13.5	14.109
20	0 23 18.97	1.7501	3 52 19.8	14.100
21	0 25 4.02	1.7517	4 6 25.5	14.091
22	0 26 49.17	1.7533	4 20 30.7	14.081
23	0 28 34.42	1.7551	N. 4 34 35.2	14.069

MONDAY 10.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	0 30 19.78	1.7569	N. 4 48 39.0	14.057
1	0 32 5.25	1.7588	5 2 42.1	14.045
2	0 33 50.83	1.7607	5 16 44.4	14.032
3	0 35 36.53	1.7627	5 30 45.9	14.018
4	0 37 22.36	1.7648	5 44 46.6	14.003
5	0 39 8.31	1.7670	5 58 46.3	13.987
6	0 40 54.40	1.7692	6 12 45.0	13.971
7	0 42 40.62	1.7715	6 26 42.8	13.954
8	0 44 26.98	1.7739	6 40 39.5	13.936
9	0 46 13.49	1.7763	6 54 35.1	13.917
10	0 48 0.14	1.7788	7 8 29.5	13.897
11	0 49 46.95	1.7815	7 22 22.7	13.877
12	0 51 33.92	1.7842	7 36 14.7	13.856
13	0 53 21.05	1.7868	7 50 5.4	13.833
14	0 55 8.34	1.7897	8 3 54.7	13.811
15	0 56 55.81	1.7926	8 17 42.7	13.788
16	0 58 43.45	1.7955	8 31 29.2	13.763
17	1 0 31.27	1.7985	8 45 14.2	13.738
18	1 2 19.27	1.8016	8 58 57.7	13.711
19	1 4 7.46	1.8047	9 12 39.5	13.683
20	1 5 55.84	1.8080	9 26 19.7	13.656
21	1 7 44.42	1.8113	9 39 58.2	13.628
22	1 9 33.20	1.8147	9 53 35.0	13.598
23	1 11 22.18	1.8181	10 7 9.9	13.566
24	1 13 11.37	1.8216	N. 10 20 42.9	13.534

TUESDAY 11.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	1 13 11.37	1.8216	N. 10 20 42.9	13.534
1	1 15 0.77	1.8252	10 34 14.0	13.502
2	1 16 50.39	1.8287	10 47 43.2	13.470
3	1 18 40.22	1.8324	11 1 10.4	13.435
4	1 20 30.28	1.8362	11 14 35.4	13.399
5	1 22 20.57	1.8401	11 27 58.3	13.363
6	1 24 11.09	1.8440	11 41 19.0	13.327
7	1 26 1.85	1.8480	11 54 37.5	13.289
8	1 27 52.85	1.8520	12 7 53.7	13.250
9	1 29 44.09	1.8561	12 21 7.5	13.210
10	1 31 35.58	1.8602	12 34 18.9	13.169
11	1 33 27.32	1.8644	12 47 27.8	13.127
12	1 35 19.31	1.8687	13 0 34.1	13.083
13	1 37 11.56	1.8731	13 13 37.8	13.040
14	1 39 4.08	1.8775	13 26 38.9	12.996
15	1 40 56.86	1.8820	13 39 37.3	12.950
16	1 42 49.92	1.8866	13 52 32.9	12.903
17	1 44 43.25	1.8912	14 5 25.7	12.855
18	1 46 36.86	1.8958	14 18 15.5	12.806
19	1 48 30.75	1.9005	14 31 2.4	12.757
20	1 50 24.92	1.9053	14 43 46.3	12.706
21	1 52 19.38	1.9102	14 56 27.1	12.653
22	1 54 14.14	1.9151	15 9 4.7	12.600
23	1 56 9.19	1.9200	N. 15 21 39.1	12.547

WEDNESDAY 12.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	1 58 4.54	1.9250	N. 15 34 10.3	12.498
1	2 0 0.19	1.9301	15 46 38.1	12.435
2	2 1 56.15	1.9352	15 59 2.5	12.377
3	2 3 52.42	1.9404	16 11 23.4	12.319
4	2 5 49.00	1.9456	16 23 40.8	12.260
5	2 7 45.89	1.9508	16 35 54.6	12.199
6	2 9 43.10	1.9562	16 48 4.7	12.137
7	2 11 40.64	1.9617	17 0 11.0	12.074
8	2 13 38.50	1.9671	17 12 13.6	12.011
9	2 15 36.69	1.9726	17 24 12.3	11.945
10	2 17 35.21	1.9781	17 36 7.0	11.878
11	2 19 34.06	1.9836	17 47 57.7	11.812
12	2 21 33.24	1.9893	17 59 44.4	11.743
13	2 23 32.77	1.9950	18 11 26.9	11.673
14	2 25 32.64	2.0007	18 23 5.1	11.602
15	2 27 32.85	2.0064	18 34 39.1	11.530
16	2 29 33.41	2.0122	18 46 8.7	11.457
17	2 31 34.32	2.0181	18 57 33.9	11.382
18	2 33 35.58	2.0240	19 8 54.5	11.305
19	2 35 37.20	2.0299	19 20 10.5	11.228
20	2 37 39.17	2.0358	19 31 21.9	11.151
21	2 39 41.50	2.0418	19 42 28.6	11.072
22	2 41 44.19	2.0479	19 53 30.5	10.991
23	2 43 47.25	2.0540	20 4 27.5	10.909
24	2 45 50.67	2.0600	N. 20 15 19.6	10.826

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 13.					SATURDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	2 45 50.67	2.0600	N.20 15 19.6	10.826	0	4 31 54.92	2.3531	N.26 55 10.0	5.352
1	2 47 54.45	2.0662	20 26 6.6	10.742	1	4 34 16.26	2.3583	27 0 26.8	5.208
2	2 49 58.60	2.0724	20 36 48.6	10.657	2	4 36 37.91	2.3633	27 5 34.9	5.063
3	2 52 3.13	2.0785	20 47 25.4	10.569	3	4 38 59.86	2.3684	27 10 34.3	4.918
4	2 54 8.03	2.0847	20 57 56.9	10.481	4	4 41 22.12	2.3734	27 15 25.0	4.771
5	2 56 13.30	2.0910	21 8 23.1	10.392	5	4 43 44.67	2.3783	27 20 6.8	4.622
6	2 58 18.95	2.0973	21 18 43.9	10.302	6	4 46 7.51	2.3831	27 24 39.7	4.473
7	3 0 24.97	2.1035	21 28 59.3	10.210	7	4 48 30.64	2.3878	27 29 3.6	4.323
8	3 2 31.37	2.1097	21 39 9.1	10.116	8	4 50 54.05	2.3924	27 33 18.5	4.172
9	3 4 38.14	2.1160	21 49 13.2	10.022	9	4 53 17.73	2.3969	27 37 24.3	4.021
10	3 6 45.29	2.1223	21 59 11.7	9.927	10	4 55 41.68	2.4014	27 41 21.0	3.868
11	3 8 52.82	2.1287	22 9 4.4	9.829	11	4 58 5.90	2.4057	27 45 8.5	3.714
12	3 11 0.73	2.1350	22 18 51.2	9.731	12	5 0 30.37	2.4099	27 48 46.7	3.559
13	3 13 9.02	2.1413	22 28 32.1	9.632	13	5 2 55.09	2.4141	27 52 15.6	3.404
14	3 15 17.69	2.1477	22 38 7.0	9.531	14	5 5 20.06	2.4182	27 55 35.2	3.248
15	3 17 26.75	2.1542	22 47 35.8	9.428	15	5 7 45.27	2.4221	27 58 45.4	3.091
16	3 19 36.19	2.1605	22 56 58.4	9.324	16	5 10 10.71	2.4258	28 1 46.1	2.933
17	3 21 46.01	2.1668	23 6 14.7	9.220	17	5 12 36.37	2.4295	28 4 37.4	2.775
18	3 23 56.21	2.1732	23 15 24.8	9.114	18	5 15 2.25	2.4332	28 7 19.1	2.615
19	3 26 6.80	2.1797	23 24 28.4	9.007	19	5 17 28.35	2.4367	28 9 51.2	2.455
20	3 28 17.77	2.1860	23 33 25.6	8.899	20	5 19 54.65	2.4400	28 12 13.7	2.294
21	3 30 29.12	2.1923	23 42 16.3	8.789	21	5 22 21.15	2.4432	28 14 26.5	2.132
22	3 32 40.85	2.1987	23 51 0.3	8.678	22	5 24 47.84	2.4464	28 16 29.6	1.970
23	3 34 52.96	2.2050	N.23 59 37.6	8.565	23	5 27 14.72	2.4494	N.28 18 22.9	1.807
	FRIDAY 14.					SUNDAY 16.			
0	3 37 5.45	2.2113	N.24 8 8.1	8.452	0	5 29 41.77	2.4523	N.28 20 6.5	1.644
1	3 39 18.32	2.2177	24 16 31.8	8.337	1	5 32 8.99	2.4550	28 21 40.2	1.480
2	3 41 31.57	2.2240	24 24 48.5	8.220	2	5 34 36.37	2.4577	28 23 4.1	1.316
3	3 43 45.20	2.2303	24 32 58.2	8.102	3	5 37 3.91	2.4602	28 24 18.1	1.150
4	3 45 59.20	2.2365	24 41 0.8	7.983	4	5 39 31.60	2.4626	28 25 22.1	0.984
5	3 48 13.58	2.2427	24 48 56.2	7.863	5	5 41 59.42	2.4648	28 26 16.2	0.819
6	3 50 28.33	2.2489	24 56 44.4	7.742	6	5 44 27.38	2.4670	28 27 0.4	0.652
7	3 52 43.45	2.2551	25 4 25.3	7.620	7	5 46 55.46	2.4690	28 27 34.5	0.485
8	3 54 58.94	2.2612	25 11 58.8	7.497	8	5 49 23.66	2.4709	28 27 58.6	0.318
9	3 57 14.80	2.2673	25 19 24.9	7.372	9	5 51 51.97	2.4727	28 28 12.6	+0.150
10	3 59 31.02	2.2733	25 26 43.4	7.245	10	5 54 20.38	2.4743	28 28 16.6	−0.018
11	4 1 47.60	2.2794	25 33 54.3	7.117	11	5 56 48.89	2.4758	28 28 10.5	0.187
12	4 4 4.55	2.2855	25 40 57.5	6.988	12	5 59 17.48	2.4772	28 27 54.2	0.356
13	4 6 21.86	2.2914	25 47 52.9	6.858	13	6 1 46.15	2.4784	28 27 27.8	0.524
14	4 8 39.52	2.2973	25 54 40.5	6.727	14	6 4 14.89	2.4795	28 26 51.3	0.693
15	4 10 57.53	2.3031	26 1 20.2	6.595	15	6 6 43.69	2.4804	28 26 4.6	0.863
16	4 13 15.89	2.3088	26 7 51.9	6.462	16	6 9 12.54	2.4812	28 25 7.7	1.032
17	4 15 34.59	2.3146	26 14 15.6	6.327	17	6 11 41.44	2.4819	28 24 0.7	1.202
18	4 17 53.64	2.3203	26 20 31.1	6.190	18	6 14 10.37	2.4825	28 22 43.5	1.372
19	4 20 13.03	2.3259	26 26 38.4	6.053	19	6 16 39.34	2.4830	28 21 16.0	1.542
20	4 22 32.75	2.3315	26 32 37.5	5.916	20	6 19 8.33	2.4833	28 19 38.4	1.712
21	4 24 52.81	2.3370	26 38 28.3	5.777	21	6 21 37.34	2.4835	28 17 50.6	1.882
22	4 27 13.19	2.3423	26 44 10.7	5.636	22	6 24 6.35	2.4835	28 15 52.6	2.052
23	4 29 33.89	2.3477	26 49 44.6	5.494	23	6 26 35.36	2.4834	28 13 44.4	2.222
24	4 31 54.92	2.3531	N.26 55 10.0	5.352	24	6 29 4.36	2.4832	N.28 11 26.0	2.392

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 17.					WEDNESDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	6 29 4.36	2.4832	N.28 11 26.0	2.392	0	8 25 54.81	2.3525	N.23 8 26.1	9.968
1	6 31 33.34	2.4828	28 8 57.4	2.562	1	8 28 15.83	2.3482	22 58 23.9	10.106
2	6 34 2.30	2.4823	28 6 18.6	2.732	2	8 30 36.59	2.3438	22 48 13.4	10.242
3	6 36 31.22	2.4818	28 3 29.6	2.901	3	8 32 57.09	2.3394	22 37 54.8	10.377
4	6 39 0.11	2.4811	28 0 30.5	3.070	4	8 35 17.32	2.3350	22 27 28.2	10.510
5	6 41 28.95	2.4802	27 57 21.2	3.240	5	8 37 37.29	2.3307	22 16 53.6	10.642
6	6 43 57.73	2.4792	27 54 1.7	3.409	6	8 39 57.01	2.3264	22 6 11.1	10.773
7	6 46 26.45	2.4781	27 50 32.1	3.577	7	8 42 16.46	2.3219	21 55 20.8	10.903
8	6 48 55.10	2.4769	27 46 52.5	3.745	8	8 44 35.64	2.3175	21 44 22.7	11.032
9	6 51 23.68	2.4756	27 43 2.7	3.914	9	8 46 54.56	2.3131	21 33 16.9	11.161
10	6 53 52.17	2.4741	27 39 2.8	4.082	10	8 49 13.21	2.3087	21 22 3.4	11.288
11	6 56 20.57	2.4726	27 34 52.9	4.248	11	8 51 31.60	2.3043	21 10 42.4	11.413
12	6 58 48.88	2.4709	27 30 33.0	4.415	12	8 53 49.72	2.2998	20 59 13.9	11.537
13	7 1 17.08	2.4691	27 26 3.1	4.582	13	8 56 7.58	2.2954	20 47 38.0	11.659
14	7 3 45.17	2.4672	27 21 23.2	4.748	14	8 58 25.17	2.2910	20 35 54.8	11.781
15	7 6 13.14	2.4652	27 16 33.3	4.914	15	9 0 42.50	2.2866	20 24 4.3	11.901
16	7 8 40.99	2.4630	27 11 33.5	5.079	16	9 2 59.56	2.2822	20 12 6.7	12.020
17	7 11 8.70	2.4608	27 6 23.8	5.243	17	9 5 16.36	2.2778	20 0 1.9	12.138
18	7 13 36.28	2.4585	27 1 4.3	5.408	18	9 7 32.90	2.2736	19 47 50.1	12.255
19	7 16 3.72	2.4561	26 55 34.9	5.572	19	9 9 49.19	2.2692	19 35 31.3	12.370
20	7 18 31.01	2.4535	26 49 55.7	5.734	20	9 12 5.21	2.2648	19 23 5.7	12.483
21	7 20 58.14	2.4509	26 44 6.8	5.896	21	9 14 20.97	2.2606	19 10 33.3	12.597
22	7 23 25.11	2.4482	26 38 8.2	6.058	22	9 16 36.48	2.2563	18 57 54.1	12.709
23	7 25 51.92	2.4453	N.26 31 59.9	6.219	23	9 18 51.73	2.2521	N.18 45 8.2	12.819
	TUESDAY 18.					THURSDAY 20.			
0	7 28 18.56	2.4425	N.26 25 41.9	6.380	0	9 21 6.73	2.2479	N.18 32 15.8	12.928
1	7 30 45.02	2.4395	26 19 14.3	6.539	1	9 23 21.48	2.2438	18 19 16.9	13.035
2	7 33 11.30	2.4364	26 12 37.2	6.698	2	9 25 35.98	2.2396	18 6 11.6	13.141
3	7 35 37.39	2.4332	26 5 50.6	6.856	3	9 27 50.23	2.2354	17 53 0.0	13.246
4	7 38 3.29	2.4300	25 58 54.5	7.013	4	9 30 4.23	2.2313	17 39 42.1	13.350
5	7 40 28.99	2.4267	25 51 49.0	7.170	5	9 32 17.99	2.2273	17 26 18.0	13.452
6	7 42 54.49	2.4233	25 44 34.1	7.326	6	9 34 31.51	2.2234	17 12 47.8	13.553
7	7 45 19.78	2.4198	25 37 9.9	7.480	7	9 36 44.80	2.2195	16 59 11.6	13.653
8	7 47 44.87	2.4163	25 29 36.5	7.634	8	9 38 57.85	2.2155	16 45 29.4	13.752
9	7 50 9.74	2.4127	25 21 53.8	7.788	9	9 41 10.66	2.2117	16 31 41.3	13.850
10	7 52 34.39	2.4090	25 14 1.9	7.940	10	9 43 23.25	2.2079	16 17 47.4	13.945
11	7 54 58.82	2.4053	25 6 1.0	8.091	11	9 45 35.61	2.2041	16 3 47.9	14.039
12	7 57 23.03	2.4016	24 57 51.0	8.242	12	9 47 47.74	2.2003	15 49 42.7	14.132
13	7 59 47.01	2.3977	24 49 32.0	8.392	13	9 49 59.65	2.1967	15 35 32.0	14.224
14	8 2 10.75	2.3938	24 41 4.0	8.540	14	9 52 11.35	2.1932	15 21 15.8	14.315
15	8 4 34.26	2.3898	24 32 27.2	8.687	15	9 54 22.83	2.1896	15 6 54.2	14.404
16	8 6 57.53	2.3858	24 23 41.6	8.833	16	9 56 34.10	2.1861	14 52 27.3	14.492
17	8 9 20.56	2.3818	24 14 47.2	8.979	17	9 58 45.16	2.1827	14 37 55.2	14.578
18	8 11 43.34	2.3777	24 5 44.1	9.124	18	10 0 56.02	2.1792	14 23 17.9	14.663
19	8 14 5.88	2.3736	23 56 32.3	9.267	19	10 3 6.67	2.1759	14 8 35.6	14.747
20	8 16 28.17	2.3694	23 47 12.0	9.410	20	10 5 17.13	2.1727	13 53 48.3	14.829
21	8 18 50.21	2.3652	23 37 43.1	9.552	21	10 7 27.39	2.1694	13 38 56.1	14.910
22	8 21 12.00	2.3610	23 28 5.8	9.692	22	10 9 37.47	2.1664	13 23 59.1	14.990
23	8 23 33.53	2.3568	23 18 20.1	9.831	23	10 11 47.36	2.1633	13 8 57.3	15.068
24	8 25 54.81	2.3525	N.23 8 26.1	9.968	24	10 13 57.06	2.1603	N.12 53 50.9	15.145

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 21.					SUNDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	10 13 57.06	2.1603	N. 12 53 50.9	15.145	0	11 55 39.03	2.1098	S. 0 14 56.2	17.163
1	10 16 6.59	2.1573	12 38 39.9	15.221	1	11 57 45.65	2.1109	0 32 6.2	17.169
2	10 18 15.94	2.1544	12 23 24.4	15.294	2	11 59 52.34	2.1121	0 49 16.5	17.172
3	10 20 25.12	2.1517	12 8 4.6	15.367	3	12 1 59.10	2.1133	1 6 26.9	17.175
4	10 22 34.14	2.1489	11 52 40.4	15.438	4	12 4 5.94	2.1147	1 23 37.5	17.177
5	10 24 42.99	2.1462	11 37 12.0	15.508	5	12 6 12.87	2.1162	1 40 48.1	17.175
6	10 26 51.69	2.1437	11 21 39.4	15.577	6	12 8 19.89	2.1178	1 57 58.5	17.172
7	10 29 0.24	2.1412	11 6 2.7	15.645	7	12 10 27.00	2.1194	2 15 8.8	17.169
8	10 31 8.64	2.1387	10 50 22.0	15.711	8	12 12 34.22	2.1212	2 32 18.8	17.163
9	10 33 16.89	2.1363	10 34 37.4	15.775	9	12 14 41.54	2.1230	2 49 28.4	17.157
10	10 35 25.00	2.1341	10 18 49.0	15.838	10	12 16 48.98	2.1249	3 6 37.5	17.148
11	10 37 32.98	2.1319	10 2 56.9	15.899	11	12 18 56.53	2.1269	3 23 46.1	17.137
12	10 39 40.83	2.1297	9 47 1.1	15.960	12	12 21 4.21	2.1291	3 40 54.0	17.125
13	10 41 48.55	2.1277	9 31 1.7	16.018	13	12 23 12.02	2.1313	3 58 1.1	17.111
14	10 43 56.16	2.1258	9 14 58.9	16.075	14	12 25 19.96	2.1335	4 15 7.3	17.095
15	10 46 3.65	2.1238	8 58 52.7	16.132	15	12 27 28.04	2.1359	4 32 12.5	17.078
16	10 48 11.02	2.1220	8 42 43.1	16.187	16	12 29 36.27	2.1384	4 49 16.6	17.059
17	10 50 18.29	2.1203	8 26 30.3	16.239	17	12 31 44.65	2.1409	5 6 19.6	17.039
18	10 52 25.46	2.1187	8 10 14.4	16.291	18	12 33 53.18	2.1435	5 23 21.3	17.017
19	10 54 32.53	2.1171	7 53 55.4	16.342	19	12 36 1.87	2.1462	5 40 21.6	16.993
20	10 56 39.51	2.1157	7 37 33.4	16.391	20	12 38 10.73	2.1491	5 57 20.4	16.967
21	10 58 46.41	2.1142	7 21 8.5	16.438	21	12 40 19.76	2.1520	6 14 17.6	16.939
22	11 0 53.22	2.1128	7 4 40.8	16.484	22	12 42 28.97	2.1550	6 31 13.1	16.911
23	11 2 59.95	2.1117	N. 6 48 10.4	16.528	23	12 44 38.36	2.1581	S. 6 48 6.9	16.880
	SATURDAY 22.					MONDAY 24.			
0	11 5 6.62	2.1106	N. 6 31 37.4	16.572	0	12 46 47.94	2.1612	S. 7 4 58.7	16.847
1	11 7 13.22	2.1095	6 15 1.8	16.613	1	12 48 57.71	2.1644	7 21 48.5	16.813
2	11 9 19.76	2.1085	5 58 23.8	16.653	2	12 51 7.67	2.1677	7 38 36.2	16.777
3	11 11 26.24	2.1076	5 41 43.4	16.692	3	12 53 17.84	2.1712	7 55 21.7	16.739
4	11 13 32.67	2.1068	5 25 0.7	16.730	4	12 55 28.22	2.1747	8 12 4.9	16.700
5	11 15 39.06	2.1062	5 8 15.8	16.766	5	12 57 38.80	2.1782	8 28 45.7	16.659
6	11 17 45.41	2.1056	4 51 28.8	16.800	6	12 59 49.60	2.1818	8 45 24.0	16.616
7	11 19 51.73	2.1050	4 34 39.8	16.833	7	13 2 0.62	2.1856	9 1 59.6	16.571
8	11 21 58.01	2.1045	4 17 48.8	16.865	8	13 4 11.87	2.1894	9 18 32.5	16.524
9	11 24 4.27	2.1042	4 0 56.0	16.895	9	13 6 23.35	2.1932	9 35 2.5	16.476
10	11 26 10.52	2.1040	3 44 1.4	16.923	10	13 8 35.06	2.1972	9 51 29.6	16.427
11	11 28 16.75	2.1038	3 27 5.2	16.950	11	13 10 47.01	2.2012	10 7 53.7	16.374
12	11 30 22.97	2.1037	3 10 7.4	16.976	12	13 12 59.21	2.2054	10 24 14.5	16.319
13	11 32 29.19	2.1037	2 53 8.1	17.000	13	13 15 11.66	2.2096	10 40 32.0	16.264
14	11 34 35.42	2.1038	2 36 7.4	17.022	14	13 17 24.36	2.2138	10 56 46.2	16.207
15	11 36 41.65	2.1039	2 19 5.4	17.043	15	13 19 37.31	2.2181	11 12 56.9	16.148
16	11 38 47.89	2.1042	2 2 2.2	17.063	16	13 21 50.53	2.2225	11 29 3.9	16.086
17	11 40 54.16	2.1047	1 44 57.9	17.081	17	13 24 4.01	2.2270	11 45 7.2	16.023
18	11 43 0.45	2.1051	1 27 52.5	17.097	18	13 26 17.77	2.2316	12 1 6.7	15.959
19	11 45 6.77	2.1057	1 10 46.2	17.112	19	13 28 31.80	2.2361	12 17 2.3	15.892
20	11 47 13.13	2.1063	0 53 39.1	17.125	20	13 30 46.10	2.2407	12 32 53.8	15.823
21	11 49 19.53	2.1071	0 36 31.2	17.137	21	13 33 0.68	2.2454	12 48 41.1	15.753
22	11 51 25.98	2.1078	0 19 22.6	17.148	22	13 35 15.55	2.2502	13 4 24.2	15.682
23	11 53 32.47	2.1087	N. 0 2 13.4	17.157	23	13 37 30.71	2.2551	13 20 2.9	15.608
24	11 55 39.03	2.1098	S. 0 14 56.2	17.163	24	13 39 46.16	2.2600	S. 13 35 37.1	15.532

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 25.					THURSDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	13 39 46.16	2.2600	S. 13 35 37.1	15.532	0	15 34 29.05	2.5192	S. 23 58 29.4	9.741
1	13 42 1.91	2.2649	13 51 6.7	15.453	1	15 37 0.34	2.5239	24 8 9.0	9.579
2	13 44 17.95	2.2699	14 6 31.5	15.373	2	15 39 31.92	2.5286	24 17 38.9	9.416
3	13 46 34.30	2.2750	14 21 51.5	15.292	3	15 42 3.77	2.5331	24 26 58.9	9.252
4	13 48 50.95	2.2801	14 37 6.6	15.209	4	15 44 35.89	2.5375	24 36 9.1	9.087
5	13 51 7.91	2.2853	14 52 16.6	15.123	5	15 47 8.27	2.5419	24 45 9.3	8.920
6	13 53 25.19	2.2906	15 7 21.4	15.036	6	15 49 40.92	2.5462	24 53 59.5	8.752
7	13 55 42.78	2.2958	15 22 20.9	14.948	7	15 52 13.82	2.5504	25 2 39.5	8.582
8	13 58 0.68	2.3011	15 37 15.1	14.857	8	15 54 46.97	2.5545	25 11 9.3	8.412
9	14 0 18.91	2.3064	15 52 3.7	14.763	9	15 57 20.36	2.5584	25 19 28.9	8.241
10	14 2 37.45	2.3118	16 6 46.7	14.669	10	15 59 53.98	2.5622	25 27 38.2	8.068
11	14 4 56.32	2.3172	16 21 24.0	14.573	11	16 2 27.83	2.5660	25 35 37.0	7.893
12	14 7 15.52	2.3227	16 35 55.4	14.474	12	16 5 1.90	2.5697	25 43 25.4	7.718
13	14 9 35.04	2.3282	16 50 20.9	14.374	13	16 7 36.19	2.5732	25 51 3.2	7.543
14	14 11 54.90	2.3337	17 4 40.3	14.272	14	16 10 10.68	2.5765	25 58 30.5	7.367
15	14 14 15.08	2.3392	17 18 53.5	14.168	15	16 12 45.37	2.5798	26 5 47.2	7.188
16	14 16 35.60	2.3448	17 33 0.4	14.062	16	16 15 20.26	2.5830	26 12 53.1	7.008
17	14 18 56.45	2.3503	17 47 0.9	13.954	17	16 17 55.33	2.5859	26 19 48.2	6.829
18	14 21 17.64	2.3560	18 0 54.9	13.844	18	16 20 30.57	2.5888	26 26 32.6	6.649
19	14 23 39.17	2.3617	18 14 42.2	13.732	19	16 23 5.98	2.5915	26 33 6.1	6.468
20	14 26 1.04	2.3673	18 28 22.8	13.620	20	16 25 41.55	2.5941	26 39 28.7	6.285
21	14 28 23.25	2.3729	18 41 56.6	13.505	21	16 28 17.27	2.5966	26 45 40.3	6.102
22	14 30 45.79	2.3786	18 55 23.4	13.388	22	16 30 53.14	2.5989	26 51 41.0	5.919
23	14 33 8.68	2.3842	S. 19 8 43.1	13.268	23	16 33 29.14	2.6010	S. 26 57 30.6	5.735
	WEDNESDAY 26.					FRIDAY 28.			
0	14 35 31.90	2.3898	S. 19 21 55.6	13.148	0	16 36 5.26	2.6030	S. 27 3 9.2	5.551
1	14 37 55.46	2.3956	19 35 0.8	13.026	1	16 38 41.50	2.6049	27 8 36.7	5.365
2	14 40 19.37	2.4013	19 47 58.7	12.902	2	16 41 17.85	2.6066	27 13 53.0	5.178
3	14 42 43.62	2.4070	20 0 49.0	12.775	3	16 43 54.29	2.6081	27 18 58.1	4.992
4	14 45 8.21	2.4127	20 13 31.7	12.647	4	16 46 30.82	2.6095	27 23 52.0	4.805
5	14 47 33.14	2.4183	20 26 6.7	12.518	5	16 49 7.43	2.6108	27 28 34.7	4.618
6	14 49 58.40	2.4238	20 38 33.8	12.387	6	16 51 44.11	2.6118	27 33 6.1	4.430
7	14 52 24.00	2.4295	20 50 53.1	12.254	7	16 54 20.85	2.6127	27 37 26.3	4.242
8	14 54 49.94	2.4352	21 3 4.3	12.118	8	16 56 57.63	2.6134	27 41 35.2	4.054
9	14 57 16.22	2.4408	21 15 7.3	11.982	9	16 59 34.46	2.6141	27 45 32.8	3.866
10	14 59 42.83	2.4463	21 27 2.1	11.844	10	17 2 11.32	2.6144	27 49 19.1	3.677
11	15 2 9.77	2.4518	21 38 48.6	11.705	11	17 4 48.19	2.6147	27 52 54.0	3.488
12	15 4 37.04	2.4573	21 50 26.7	11.563	12	17 7 25.08	2.6148	27 56 17.6	3.299
13	15 7 4.64	2.4627	22 1 56.2	11.419	13	17 10 1.97	2.6147	27 59 29.9	3.110
14	15 9 32.56	2.4681	22 13 17.0	11.274	14	17 12 38.84	2.6143	28 2 30.8	2.920
15	15 12 0.81	2.4735	22 24 29.1	11.128	15	17 15 15.69	2.6139	28 5 20.3	2.731
16	15 14 29.38	2.4788	22 35 32.4	10.981	16	17 17 52.51	2.6133	28 7 58.5	2.542
17	15 16 58.26	2.4840	22 46 26.8	10.831	17	17 20 29.29	2.6126	28 10 25.4	2.354
18	15 19 27.46	2.4892	22 57 12.1	10.679	18	17 23 6.02	2.6117	28 12 41.0	2.165
19	15 21 56.97	2.4944	23 7 48.3	10.527	19	17 25 42.69	2.6105	28 14 45.2	1.976
20	15 24 26.79	2.4995	23 18 15.3	10.372	20	17 28 19.28	2.6092	28 16 38.1	1.788
21	15 26 56.91	2.5045	23 28 33.0	10.217	21	17 30 55.79	2.6078	28 18 19.7	1.600
22	15 29 27.33	2.5094	23 38 41.3	10.059	22	17 33 32.21	2.6062	28 19 50.1	1.412
23	15 31 58.04	2.5143	23 48 40.1	9.901	23	17 36 8.53	2.6045	28 21 9.2	1.224
24	15 34 29.05	2.5192	S. 23 58 29.4	9.741	24	17 38 44.73	2.6023	S. 28 22 17.0	1.037

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 29.			
	h m s	s	° ′ ″	″
0	17 38 44.73	2.6083	S. 28 22 17.0	1.037
1	17 41 20.81	2.6002	28 23 13.6	0.850
2	17 43 56.75	2.5978	28 23 59.0	0.664
3	17 46 32.55	2.5954	28 24 33.3	0.478
4	17 49 8.20	2.5927	28 24 56.4	0.293
5	17 51 43.68	2.5899	28 25 8.5	−0.109
6	17 54 18.99	2.5870	28 25 9.5	+0.076
7	17 56 54.12	2.5839	28 24 59.4	0.259
8	17 59 29.06	2.5806	28 24 38.4	0.441
9	18 2 3.79	2.5772	28 24 6.5	0.623
10	18 4 38.32	2.5736	28 23 23.6	0.805
11	18 7 12.62	2.5698	28 22 29.9	0.985
12	18 9 46.70	2.5660	28 21 25.4	1.164
13	18 12 20.54	2.5618	28 20 10.2	1.343
14	18 14 54.12	2.5576	28 18 44.2	1.522
15	18 17 27.45	2.5533	28 17 7.6	1.698
16	18 20 0.52	2.5489	28 15 20.4	1.874
17	18 22 33.32	2.5442	28 13 22.7	2.049
18	18 25 5.83	2.5394	28 11 14.5	2.223
19	18 27 38.05	2.5346	28 8 55.9	2.396
20	18 30 9.98	2.5297	28 6 27.0	2.568
21	18 32 41.61	2.5245	28 3 47.8	2.738
22	18 35 12.92	2.5192	28 0 58.4	2.908
23	18 37 43.91	2.5138	S. 27 57 58.8	3.077
	SUNDAY 30.			
0	18 40 14.57	2.5083	S. 27 54 49.1	3.244
1	18 42 44.90	2.5026	27 51 29.5	3.410
2	18 45 14.88	2.4968	27 47 59.9	3.576
3	18 47 44.51	2.4909	27 44 20.4	3.739
4	18 50 13.79	2.4850	27 40 31.2	3.901
5	18 52 42.71	2.4789	27 36 32.3	4.062
6	18 55 11.26	2.4728	27 32 23.8	4.222
7	18 57 39.44	2.4665	27 28 5.7	4.381
8	19 0 7.24	2.4601	27 23 38.1	4.538
9	19 2 34.65	2.4537	27 19 1.1	4.694
10	19 5 1.68	2.4472	27 14 14.8	4.849
11	19 7 28.31	2.4405	27 9 19.2	5.002
12	19 9 54.54	2.4338	27 4 14.5	5.154
13	19 12 20.37	2.4270	26 59 0.7	5.304
14	19 14 45.78	2.4201	26 53 38.0	5.452
15	19 17 10.78	2.4132	26 48 6.4	5.600
16	19 19 35.36	2.4062	26 42 26.0	5.747
17	19 21 59.52	2.3992	26 36 36.8	5.892
18	19 24 23.26	2.3921	26 30 39.0	6.035
19	19 26 46.57	2.3849	26 24 32.6	6.177
20	19 29 9.45	2.3777	26 18 17.8	6.317
21	19 31 31.89	2.3703	26 11 54.6	6.455
22	19 33 53.89	2.3630	26 5 23.2	6.593
23	19 36 15.45	2.3557	25 58 43.5	6.729
24	19 38 36.57	2.3483	S. 25 51 55.7	6.865

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY, DECEMBER 1.			
	h m s	s	° ′ ″	″
0	19 38 36.57	2.3483	S. 25 51 55.7	6.863

PHASES OF THE MOON.

			d	h	m
☽	First Quarter . .	Nov.	5	6	34.4
○	Full Moon		13	11	11.4
☾	Last Quarter		20	19	56.5
●	New Moon		27	13	41.2

			d	h
☾	Apogee	Nov.	8	15.9
☾	Perigee		24	17.6

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from	Diff. for 1 Hour
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.		Added to Apparent Time.	
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Mon.	1	16 27 54.85	10.791	S.21 45 58.2	−23.68	16 15.30	70.22	11 0.20	0.932
Tues.	2	16 32 14.17	10.817	21 55 14.0	22.63	16 15.46	70.31	10 37.50	0.959
Wed.	3	16 36 34.10	10.843	22 4 4.4	21.57	16 15.61	70.39	10 14.19	0.984
Thur.	4	16 40 54.63	10.867	22 12 29.3	−20.50	16 15.76	70.47	9 50.29	1.008
Fri.	5	16 45 15.72	10.890	22 20 28.4	19.42	16 15.90	70.55	9 25.82	1.031
Sat.	6	16 49 37.36	10.912	22 28 1.3	18.32	16 16.04	70.62	9 0.81	1.053
SUN.	7	16 53 59.51	10.933	22 35 7.9	−17.22	16 16.18	70.69	8 35.29	1.073
Mon.	8	16 58 22.16	10.953	22 41 48.0	16.11	16 16.31	70.76	8 9.28	1.093
Tues.	9	17 2 45.26	10.971	22 48 1.3	14.99	16 16.44	70.83	7 42.80	1.112
Wed.	10	17 7 8.79	10.989	22 53 47.7	−13.86	16 16.56	70.89	7 15.89	1.129
Thur.	11	17 11 32.74	11.006	22 59 6.9	12.73	16 16.67	70.95	6 48.57	1.146
Fri.	12	17 15 57.08	11.022	23 3 58.9	11.59	16 16.78	71.00	6 20.87	1.161
Sat.	13	17 20 21.78	11.036	23 8 23.5	−10.45	16 16.88	71.04	5 52.82	1.176
SUN.	14	17 24 46.80	11.049	23 12 20.5	9.30	16 16.98	71.08	5 24.43	1.189
Mon.	15	17 29 12.13	11.061	23 15 49.8	8.14	16 17.07	71.12	4 55.74	1.201
Tues.	16	17 33 37.73	11.072	23 18 51.2	− 6.97	16 17.16	71.15	4 26.78	1.212
Wed.	17	17 38 3.58	11.081	23 21 24.7	5.81	16 17.24	71.18	3 57.57	1.221
Thur.	18	17 42 29.64	11.089	23 23 30.2	4.64	16 17.31	71.21	3 28.14	1.230
Fri.	19	17 46 55.89	11.096	23 25 7.6	− 3.47	16 17.38	71.23	2 58.53	1.237
Sat.	20	17 51 22.30	11.103	23 26 16.8	2.30	16 17.44	71.24	2 28.76	1.242
SUN.	21	17 55 48.83	11.107	23 26 57.8	− 1.12	16 17.50	71.25	1 58.88	1.246
Mon.	22	18 0 15.44	11.110	23 27 10.4	+ 0.07	16 17.56	71.26	1 28.91	1.249
Tues.	23	18 4 42.11	11.111	23 26 54.6	1.25	16 17.61	71.26	0 58.89	1.251
Wed.	24	18 9 8.79	11.110	23 26 10.6	2.42	16 17.65	71.25	0 28.85	1.251
Thur.	25	18 13 35.44	11.109	23 24 58.2	+ 3.60	16 17.69	71.24	0 1.16	1.249
Fri.	26	18 18 2.02	11.106	23 23 17.5	4.78	16 17.73	71.23	0 31.11	1.245
Sat.	27	18 22 28.50	11.101	23 21 8.5	5.96	16 17.76	71.22	1 0.95	1.240
SUN.	28	18 26 54.85	11.094	23 18 31.3	+ 7.13	16 17.79	71.20	1 30.65	1.233
Mon.	29	18 31 21.02	11.086	23 15 26.0	8.30	16 17.81	71.18	2 0.17	1.225
Tues.	30	18 35 46.96	11.076	23 11 52.6	9.47	16 17.83	71.15	2 29.48	1.215
Wed.	31	18 40 12.64	11.064	23 7 51.3	10.63	16 17.85	71.11	2 58.54	1.204
Thur.	32	18 44 38.04	11.051	S.23 3 22.2	+11.79	16 17.86	71.07	3 27.30	1.191

Note.—The mean time of semidiameter passing the meridian may be found by subtracting $0^s.19$ from the sidereal time.

The sign − prefixed to the hourly change of declination indicates that south declinations are increasing; the sign + indicates that south declinations are decreasing.

DECEMBER, 1913.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time to be Added to / Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Mon.	1	16 27 56.82	10.789	S. 21 46 2.5	−23.67	11 0.03	0.932	16 38 56.86
Tues.	2	16 32 16.08	10.815	21 55 18.0	22.62	10 37.33	0.959	16 42 53.41
Wed.	3	16 36 35.95	10.840	22 4 8.1	21.56	10 14.02	0.984	16 46 49.97
Thur.	4	16 40 56.41	10.864	22 12 32.7	−20.49	9 50.12	1.008	16 50 46.53
Fri.	5	16 45 17.43	10.887	22 20 31.5	19.40	9 25.66	1.031	16 54 43.09
Sat.	6	16 49 39.00	10.909	22 28 4.1	18.31	9 0.66	1.053	16 58 39.65
SUN.	7	16 54 1.08	10.930	22 35 10.4	−17.21	8 35.14	1.073	17 2 36.21
Mon.	8	16 58 23.64	10.950	22 41 50.2	16.10	8 9.13	1.093	17 6 32.77
Tues.	9	17 2 46.66	10.968	22 48 3.2	14.98	7 42.66	1.112	17 10 29.32
Wed.	10	17 7 10.12	10.986	22 53 49.3	−13.86	7 15.76	1.129	17 14 25.88
Thur.	11	17 11 34.00	11.003	22 59 8.3	12.73	6 48.45	1.146	17 18 22.44
Fri.	12	17 15 58.25	11.018	23 4 0.1	11.59	6 20.75	1.161	17 22 19.00
Sat.	13	17 20 22.86	11.032	23 8 24.5	−10.44	5 52.70	1.176	17 26 15.56
SUN.	14	17 24 47.80	11.045	23 12 21.3	9.29	5 24.32	1.189	17 30 12.12
Mon.	15	17 29 13.04	11.057	23 15 50.4	8.13	4 55.64	1.201	17 34 8.68
Tues.	16	17 33 38.55	11.068	23 18 51.7	− 6.97	4 26.69	1.212	17 38 5.24
Wed.	17	17 38 4.31	11.078	23 21 25.1	5.81	3 57.49	1.221	17 42 1.80
Thur.	18	17 42 30.28	11.086	23 23 30.5	4.64	3 28.07	1.230	17 45 58.36
Fri.	19	17 46 56.44	11.093	23 25 7.8	− 3.47	2 58.47	1.237	17 49 54.92
Sat.	20	17 51 22.76	11.099	23 26 16.9	2.29	2 28.71	1.242	17 53 51.47
SUN.	21	17 55 49.20	11.103	23 26 57.8	− 1.11	1 58.84	1.246	17 57 48.03
Mon.	22	18 0 15.72	11.106	23 27 10.4	+ 0.07	1 28.88	1.249	18 1 44.59
Tues.	23	18 4 42.29	11.108	23 26 54.7	1.25	0 58.87	1.251	18 5 41.15
Wed.	24	18 9 8.87	11.107	23 26 10.6	2.43	0 28.84	1.251	18 9 37.71
Thur.	25	18 13 35.43	11.105	23 24 58.2	+ 3.61	0 1.16	1.249	18 13 34.27
Fri.	26	18 18 1.93	11.102	23 23 17.5	4.79	0 31.10	1.245	18 17 30.83
Sat.	27	18 22 28.32	11.097	23 21 8.6	5.96	1 0.93	1.240	18 21 27.39
SUN.	28	18 26 54.57	11.090	23 18 31.5	+ 7.13	1 30.62	1.233	18 25 23.95
Mon.	29	18 31 20.65	11.082	23 15 26.3	8.30	2 0.13	1.225	18 29 20.51
Tues.	30	18 35 46.50	11.072	23 11 53.0	9.47	2 29.43	1.215	18 33 17.07
Wed.	31	18 40 12.10	11.061	23 7 51.8	10.63	2 58.48	1.204	18 37 13.63
Thur.	32	18 44 37.41	11.048	S. 23 3 22.9	+11.78	3 27.23	1.191	18 41 10.18

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign − prefixed to the hourly change of declination indicates that south declinations are increasing; the sign + indicates that south declinations are decreasing.

Diff. for 1 Hour, $+9^{s}.8565$. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S True Longitude. λ	THE SUN'S True Longitude. λ′	THE SUN'S Diff. for 1 Hour.	THE SUN'S Latitude.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		° ′ ″	′ ″	″	″			h m s
1	335	248 43 1.3	42 13.2	152.15	−0.51	9.993 8123	−29.4	7 19 50.89
2	336	249 43 53.4	43 5.1	152.19	0.44	9.993 7425	28.8	7 15 54.98
3	337	250 44 46.4	43 57.9	152.23	0.35	9.993 6743	28.1	7 11 59.06
4	338	251 45 40.2	44 51.6	152.26	−0.25	9.993 6078	−27.3	7 8 3.15
5	339	252 46 34.8	45 46.1	152.29	0.14	9.993 5431	26.5	7 4 7.24
6	340	253 47 30.3	46 41.3	152.32	−0.02	9.993 4804	25.7	7 0 11.32
7	341	254 48 26.4	47 37.2	152.35	+0.11	9.993 4197	−24.8	6 56 15.41
8	342	255 49 23.2	48 33.8	152.38	0.23	9.993 3612	23.9	6 52 19.50
9	343	256 50 20.8	49 31.2	152.41	0.34	9.993 3051	22.9	6 48 23.59
10	344	257 51 19.0	50 29.3	152.44	+0.43	9.993 2514	−21.9	6 44 27.67
11	345	258 52 17.9	51 28.0	152.47	0.49	9.993 2002	20.8	6 40 31.76
12	346	259 53 17.6	52 27.4	152.50	0.53	9.993 1515	19.7	6 36 35.85
13	347	260 54 17.9	53 27.6	152.53	+0.54	9.993 1055	−18.6	6 32 39.93
14	348	261 55 19.0	54 28.5	152.56	0.52	9.993 0622	17.5	6 28 44.02
15	349	262 56 20.9	55 30.2	152.59	0.48	9.993 0217	16.3	6 24 48.11
16	350	263 57 23.6	56 32.6	152.62	+0.40	9.992 9839	−15.2	6 20 52.20
17	351	264 58 27.1	57 35.9	152.66	0.31	9.992 9488	14.1	6 16 56.28
18	352	265 59 31.4	58 40.1	152.70	0.20	9.992 9163	13.0	6 13 0.37
19	353	266 60 36.6	59 45.1	152.73	+0.06	9.992 8862	−12.0	6 9 4.46
20	354	268 1 42.7	0 50.9	152.77	−0.07	9.992 8585	11.1	6 5 8.54
21	355	269 2 49.5	1 57.5	152.80	0.20	9.992 8330	10.2	6 1 12.63
22	356	270 3 57.1	3 4.9	152.83	−0.31	9.992 8096	− 9.4	5 57 16.72
23	357	271 5 5.4	4 13.1	152.86	0.40	9.992 7882	8.6	5 53 20.80
24	358	272 6 14.4	5 21.9	152.89	0.47	9.992 7686	7.8	5 49 24.89
25	359	273 7 23.9	6 31.2	152.91	−0.52	9.992 7507	− 7.1	5 45 28.98
26	360	274 8 33.9	7 41.0	152.93	0.53	9.992 7345	6.4	5 41 33.06
27	361	275 9 44.3	8 51.1	152.94	0.51	9.992 7200	5.7	5 37 37.15
28	362	276 10 54.8	10 1.5	152.94	−0.47	9.992 7071	− 5.0	5 33 41.24
29	363	277 12 5.6	11 12.0	152.95	0.40	9.992 6958	4.3	5 29 45.32
30	364	278 13 16.4	12 22.6	152.95	0.30	9.992 6863	3.6	5 25 49.41
31	365	279 14 27.1	13 33.1	152.94	0.19	9.992 6785	2.8	5 21 53.50
32	366	280 15 37.7	14 43.5	152.94	−0.07	9.992 6726	− 2.0	5 17 57.58

Note.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ′ are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
$-9^s.8296$.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 27.5	15 21.3	56 38.12	−1.938	56 15.29	−1.859	3 6.5	2.24	3.4
2	15 15.4	15 9.9	55 53.60	1.749	55 33.41	1.610	3 57.8	2.04	4.4
3	15 4.9	15 0.4	55 15.05	1.446	54 58.77	1.264	4 44.5	1.86	5.4
4	14 56.6	14 53.5	54 44.78	−1.067	54 33.22	−0.858	5 27.5	1.73	6.4
5	14 51.0	14 49.3	54 24.20	0.644	54 17.81	−0.422	6 7.8	1.64	7.4
6	14 48.3	14 48.0	54 14.08	−0.201	54 12.98	+0.016	6 46.8	1.61	8.4
7	14 48.3	14 49.4	54 14.44	+0.226	54 18.36	+0.426	7 25.6	1.63	9.4
8	14 51.1	14 53.4	54 24.62	0.615	54 33.08	0.791	8 5.5	1.70	10.4
9	14 56.3	14 59.6	54 43.54	0.949	54 55.79	1.089	8 47.6	1.82	11.4
10	15 3.4	15 7.5	55 9.59	+1.206	55 24.66	+1.301	9 33.1	1.98	12.4
11	15 11.9	15 16.4	55 40.73	1.372	55 57.50	1.418	10 22.8	2.16	13.4
12	15 21.1	15 25.8	56 14.69	1.441	56 32.01	1.440	11 16.7	2.33	14.4
13	15 30.5	15 35.1	56 49.16	+1.415	57 5.91	+1.373	12 14.2	2.44	15.4
14	15 39.5	15 43.6	57 22.03	1.310	57 37.30	1.233	13 13.2	2.46	16.4
15	15 47.5	15 51.1	57 51.58	1.145	58 4.75	1.049	14 11.5	2.39	17.4
16	15 54.4	15 57.3	58 16.74	+0.949	58 27.53	+0.848	15 7.3	2.26	18.4
17	15 59.9	16 2.2	58 37.10	0.747	58 45.47	0.649	15 59.8	2.12	19.4
18	16 4.2	16 5.8	58 52.68	0.552	58 58.75	0.460	16 49.4	2.02	20.4
19	16 7.2	16 8.3	59 3.75	+0.373	59 7.71	+0.287	17 37.2	1.97	21.4
20	16 9.1	16 9.6	59 10.64	0.201	59 12.52	+0.111	18 24.6	1.98	22.4
21	16 9.8	16 9.7	59 13.30	+0.018	59 12.94	−0.080	19 12.8	2.05	23.4
22	16 9.2	16 8.5	59 11.34	−0.189	59 8.38	−0.306	20 3.4	2.17	24.4
23	16 7.3	16 5.6	59 3.98	0.429	58 58.06	0.560	20 57.3	2.32	25.4
24	16 3.6	16 1.1	58 50.52	0.698	58 41.31	0.838	21 54.7	2.45	26.4
25	15 58.1	15 54.7	58 30.41	−0.978	58 17.86	−1.113	22 54.5	2.52	27.4
26	15 50.9	15 46.6	58 3.75	1.237	57 48.22	1.349	23 54.7	2.48	28.4
27	15 42.0	15 37.2	57 31.45	1.442	57 13.70	1.512	6	. .	29.4
28	15 32.2	15 27.0	56 55.26	−1.557	56 36.42	−1.577	0 52.6	2.34	0.9
29	15 21.9	15 16.8	56 17.52	1.569	55 58.90	1.530	1 46.5	2.15	1.9
30	15 11.9	15 7.3	55 40.92	1.462	55 23.90	1.370	2 35.8	1.96	2.9
31	15 3.0	14 59.1	55 8.14	1.253	54 53.92	1.113	3 20.8	1.80	3.9
32	14 55.7	14 52.9	54 41.52	−0.950	54 31.18	−0.770	4 2.6	1.69	4.9

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 1.					WEDNESDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	19 38 36.57	2.3483	S. 25 51 55.7	6.863	0	21 22 42.41	1.9987	S. 18 15 41.1	11.610
1	19 40 57.24	2.3408	25 44 59.9	6.996	1	21 24 42.14	1.9923	18 4 2.5	11.677
2	19 43 17.46	2.3333	25 37 56.2	7.127	2	21 26 41.49	1.9861	17 52 19.9	11.742
3	19 45 37.23	2.3258	25 30 44.7	7.257	3	21 28 40.47	1.9799	17 40 33.5	11.806
4	19 47 56.55	2.3183	25 23 25.4	7.386	4	21 30 39.08	1.9738	17 28 43.2	11.869
5	19 50 15.42	2.3107	25 15 58.4	7.513	5	21 32 37.33	1.9678	17 16 49.2	11.931
6	19 52 33.83	2.3031	25 8 23.9	7.638	6	21 34 35.22	1.9618	17 4 51.5	11.992
7	19 54 51.79	2.2955	25 0 41.9	7.761	7	21 36 32.75	1.9559	16 52 50.2	12.052
8	19 57 9.29	2.2878	24 52 52.6	7.883	8	21 38 29.93	1.9501	16 40 45.3	12.111
9	19 59 26.33	2.2803	24 44 55.9	8.005	9	21 40 26.76	1.9443	16 28 36.9	12.168
10	20 1 42.92	2.2727	24 36 52.0	8.124	10	21 42 23.25	1.9387	16 16 25.1	12.224
11	20 3 59.05	2.2650	24 28 41.0	8.242	11	21 44 19.40	1.9330	16 4 10.0	12.280
12	20 6 14.72	2.2573	24 20 23.0	8.358	12	21 46 15.21	1.9274	15 51 51.5	12.335
13	20 8 29.93	2.2497	24 11 58.0	8.473	13	21 48 10.69	1.9219	15 39 29.8	12.388
14	20 10 44.68	2.2420	24 3 26.2	8.586	14	21 50 5.84	1.9166	15 27 4.9	12.441
15	20 12 58.97	2.2344	23 54 47.6	8.698	15	21 52 0.68	1.9113	15 14 36.9	12.492
16	20 15 12.81	2.2268	23 46 2.4	8.809	16	21 53 55.20	1.9060	15 2 5.9	12.542
17	20 17 26.19	2.2192	23 37 10.6	8.918	17	21 55 49.40	1.9008	14 49 31.8	12.592
18	20 19 39.11	2.2115	23 28 12.3	9.025	18	21 57 43.29	1.8957	14 36 54.8	12.640
19	20 21 51.57	2.2039	23 19 7.6	9.131	19	21 59 36.88	1.8907	14 24 15.0	12.688
20	20 24 3.58	2.1963	23 9 56.6	9.236	20	22 1 30.17	1.8857	14 11 32.3	12.735
21	20 26 15.13	2.1888	23 0 39.3	9.339	21	22 3 23.17	1.8808	13 58 46.8	12.781
22	20 28 26.23	2.1813	22 51 15.9	9.441	22	22 5 15.88	1.8761	13 45 58.6	12.825
23	20 30 36.88	2.1737	S. 22 41 46.4	9.541	23	22 7 8.30	1.8713	S. 13 33 7.8	12.868
	TUESDAY 2.					THURSDAY 4.			
0	20 32 47.07	2.1662	S. 22 32 11.0	9.639	0	22 9 0.44	1.8667	S. 13 20 14.4	12.911
1	20 34 56.82	2.1587	22 22 29.7	9.737	1	22 10 52.31	1.8622	13 7 18.5	12.953
2	20 37 6.12	2.1512	22 12 42.6	9.833	2	22 12 43.90	1.8576	12 54 20.0	12.995
3	20 39 14.97	2.1438	22 2 49.7	9.928	3	22 14 35.22	1.8532	12 41 19.1	13.035
4	20 41 23.38	2.1365	21 52 51.2	10.021	4	22 16 26.28	1.8489	12 28 15.8	13.074
5	20 43 31.35	2.1292	21 42 47.2	10.112	5	22 18 17.09	1.8447	12 15 10.2	13.112
6	20 45 38.88	2.1218	21 32 37.7	10.203	6	22 20 7.64	1.8404	12 2 2.3	13.150
7	20 47 45.97	2.1146	21 22 22.8	10.293	7	22 21 57.94	1.8363	11 48 52.2	13.187
8	20 49 52.63	2.1073	21 12 2.6	10.381	8	22 23 48.00	1.8323	11 35 39.9	13.223
9	20 51 58.85	2.1002	21 1 37.1	10.467	9	22 25 37.82	1.8283	11 22 25.4	13.258
10	20 54 4.65	2.0931	20 51 6.5	10.552	10	22 27 27.40	1.8244	11 9 8.9	13.292
11	20 56 10.02	2.0860	20 40 30.8	10.636	11	22 29 16.75	1.8207	10 55 50.3	13.326
12	20 58 14.97	2.0790	20 29 50.2	10.718	12	22 31 5.88	1.8170	10 42 29.8	13.358
13	21 0 19.50	2.0720	20 19 4.6	10.800	13	22 32 54.79	1.8133	10 29 7.3	13.390
14	21 2 23.61	2.0650	20 8 14.2	10.879	14	22 34 43.48	1.8098	10 15 43.0	13.421
15	21 4 27.30	2.0581	19 57 19.1	10.958	15	22 36 31.97	1.8064	10 2 16.8	13.452
16	21 6 30.58	2.0513	19 46 19.3	11.036	16	22 38 20.25	1.8030	9 48 48.8	13.481
17	21 8 33.45	2.0445	19 35 14.9	11.112	17	22 40 8.33	1.7997	9 35 19.1	13.509
18	21 10 35.92	2.0378	19 24 5.9	11.186	18	22 41 56.21	1.7964	9 21 47.7	13.537
19	21 12 37.99	2.0312	19 12 52.5	11.260	19	22 43 43.90	1.7933	9 8 14.6	13.565
20	21 14 39.66	2.0245	19 1 34.7	11.333	20	22 45 31.41	1.7903	8 54 39.9	13.591
21	21 16 40.93	2.0179	18 50 12.6	11.404	21	22 47 18.73	1.7873	8 41 3.7	13.617
22	21 18 41.81	2.0114	18 38 46.2	11.474	22	22 49 5.88	1.7844	8 27 25.9	13.642
23	21 20 42.30	2.0050	18 27 15.7	11.542	23	22 50 52.86	1.7816	8 13 46.7	13.666
24	21 22 42.41	1.9987	S. 18 15 41.1	11.610	24	22 52 39.67	1.7788	S. 8 0 6.0	13.689

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 5.					SUNDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	22 52 39.67	1.7788	S. 8 0 6.0	13.689	0	0 16 25.23	1.7419	N. 3 11 11.9	14.032
1	22 54 26.32	1.7762	7 46 24.0	13.712	1	0 18 9.78	1.7431	3 25 13.6	14.023
2	22 56 12.81	1.7736	7 32 40.6	13.734	2	0 19 54.40	1.7443	3 39 14.7	14.013
3	22 57 59.15	1.7712	7 18 55.9	13.756	3	0 21 39.10	1.7457	3 53 15.2	14.003
4	22 59 45.35	1.7687	7 5 9.9	13.777	4	0 23 23.88	1.7471	4 7 15.1	13.993
5	23 1 31.40	1.7663	6 51 22.7	13.796	5	0 25 8.75	1.7486	4 21 14.4	13.982
6	23 3 17.31	1.7641	6 37 34.4	13.815	6	0 26 53.71	1.7502	4 35 12.9	13.969
7	23 5 3.09	1.7619	6 23 44.9	13.834	7	0 28 38.77	1.7518	4 49 10.7	13.957
8	23 6 48.74	1.7598	6 9 54.3	13.852	8	0 30 23.93	1.7536	5 3 7.7	13.943
9	23 8 34.27	1.7578	5 56 2.7	13.868	9	0 32 9.20	1.7554	5 17 3.9	13.929
10	23 10 19.68	1.7559	5 42 10.1	13.885	10	0 33 54.58	1.7573	5 30 59.2	13.914
11	23 12 4.98	1.7541	5 28 16.5	13.901	11	0 35 40.08	1.7593	5 44 53.6	13.899
12	23 13 50.17	1.7523	5 14 22.0	13.916	12	0 37 25.69	1.7613	5 58 47.1	13.883
13	23 15 35.26	1.7506	5 0 26.6	13.931	13	0 39 11.43	1.7634	6 12 39.5	13.866
14	23 17 20.24	1.7489	4 46 30.3	13.945	14	0 40 57.30	1.7656	6 26 31.0	13.849
15	23 19 5.13	1.7474	4 32 33.2	13.958	15	0 42 43.30	1.7679	6 40 21.4	13.830
16	23 20 49.93	1.7459	4 18 35.3	13.971	16	0 44 29.45	1.7703	6 54 10.6	13.811
17	23 22 34.64	1.7446	4 4 36.7	13.982	17	0 46 15.74	1.7727	7 7 58.7	13.791
18	23 24 19.28	1.7433	3 50 37.4	13.993	18	0 48 2.17	1.7752	7 21 45.5	13.770
19	23 26 3.84	1.7421	3 36 37.5	14.003	19	0 49 48.76	1.7778	7 35 31.1	13.749
20	23 27 48.33	1.7410	3 22 37.0	14.013	20	0 51 35.51	1.7805	7 49 15.4	13.727
21	23 29 32.76	1.7400	3 8 35.9	14.023	21	0 53 22.42	1.7832	8 2 58.3	13.704
22	23 31 17.13	1.7390	2 54 34.2	14.032	22	0 55 9.49	1.7860	8 16 39.9	13.681
23	23 33 1.44	1.7381	S. 2 40 32.0	14.040	23	0 56 56.74	1.7890	N. 8 30 20.0	13.656
	SATURDAY 6.					MONDAY 8.			
0	23 34 45.70	1.7373	S. 2 26 29.4	14.047	0	0 58 44.17	1.7920	N. 8 43 58.6	13.631
1	23 36 29.91	1.7366	2 12 26.4	14.053	1	1 0 31.78	1.7950	8 57 35.7	13.605
2	23 38 14.09	1.7360	1 58 23.0	14.060	2	1 2 19.57	1.7981	9 11 11.2	13.578
3	23 39 58.23	1.7354	1 44 19.2	14.066	3	1 4 7.55	1.8013	9 24 45.1	13.551
4	23 41 42.34	1.7349	1 30 15.1	14.070	4	1 5 55.72	1.8045	9 38 17.3	13.523
5	23 43 26.42	1.7345	1 16 10.8	14.074	5	1 7 44.09	1.8079	9 51 47.8	13.494
6	23 45 10.48	1.7342	1 2 6.2	14.078	6	1 9 32.67	1.8114	10 5 16.6	13.464
7	23 46 54.52	1.7339	0 48 1.5	14.081	7	1 11 21.46	1.8149	10 18 43.5	13.433
8	23 48 38.55	1.7338	0 33 56.5	14.083	8	1 13 10.46	1.8184	10 32 8.6	13.402
9	23 50 22.57	1.7337	0 19 51.5	14.084	9	1 14 59.67	1.8221	10 45 31.7	13.368
10	23 52 6.59	1.7337	S. 0 5 46.4	14.085	10	1 16 49.11	1.8258	10 58 52.8	13.335
11	23 53 50.61	1.7338	N. 0 8 18.7	14.086	11	1 18 38.77	1.8297	11 12 11.9	13.302
12	23 55 34.64	1.7339	0 22 23.9	14.086	12	1 20 28.67	1.8336	11 25 29.0	13.267
13	23 57 18.68	1.7341	0 36 29.0	14.084	13	1 22 18.80	1.8375	11 38 43.9	13.231
14	23 59 2.73	1.7344	0 50 34.0	14.083	14	1 24 9.17	1.8415	11 51 56.7	13.194
15	0 0 46.81	1.7348	1 4 39.0	14.082	15	1 25 59.78	1.8456	12 5 7.2	13.157
16	0 2 30.91	1.7353	1 18 43.8	14.078	16	1 27 50.64	1.8498	12 18 15.5	13.118
17	0 4 15.04	1.7358	1 32 48.4	14.074	17	1 29 41.75	1.8540	12 31 21.4	13.078
18	0 5 59.21	1.7365	1 46 52.7	14.070	18	1 31 33.12	1.8583	12 44 24.9	13.038
19	0 7 43.42	1.7372	2 0 56.8	14.066	19	1 33 24.75	1.8627	12 57 26.0	12.997
20	0 9 27.67	1.7380	2 15 0.6	14.060	20	1 35 16.65	1.8672	13 10 24.6	12.955
21	0 11 11.97	1.7388	2 29 4.0	14.054	21	1 37 8.81	1.8717	13 23 20.6	12.912
22	0 12 56.33	1.7398	2 43 7.1	14.047	22	1 39 1.25	1.8763	13 36 14.0	12.868
23	0 14 40.75	1.7408	2 57 9.7	14.040	23	1 40 53.97	1.8809	13 49 4.7	12.823
24	0 16 25.23	1.7419	N. 3 11 11.9	14.032	24	1 42 46.96	1.8856	N. 14 1 52.7	12.777

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 9.					THURSDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	1 42 46.96	1.8856	N.14 1 52.7	12.777	0	3 19 53.33	2.1781	N.23 1 26.8	9.243
1	1 44 40.24	1.8905	14 14 37.9	12.730	1	3 22 4.22	2.1850	23 10 38.3	9.138
2	1 46 33.82	1.8954	14 27 20.3	12.682	2	3 24 15.53	2.1920	23 19 43.4	9.033
3	1 48 27.69	1.9003	14 39 59.7	12.633	3	3 26 27.26	2.1989	23 28 42.2	8.926
4	1 50 21.86	1.9053	14 52 36.2	12.583	4	3 28 39.40	2.2058	23 37 34.5	8.817
5	1 52 16.33	1.9104	15 5 9.6	12.532	5	3 30 51.96	2.2128	23 46 20.2	8.707
6	1 54 11.11	1.9156	15 17 40.0	12.480	6	3 33 4.93	2.2197	23 54 59.3	8.595
7	1 56 6.20	1.9208	15 30 7.2	12.427	7	3 35 18.32	2.2267	24 3 31.6	8.482
8	1 58 1.60	1.9261	15 42 31.2	12.373	8	3 37 32.13	2.2336	24 11 57.1	8.368
9	1 59 57.33	1.9314	15 54 51.9	12.317	9	3 39 46.35	2.2404	24 20 15.7	8.252
10	2 1 53.37	1.9368	16 7 9.2	12.261	10	3 42 0.98	2.2473	24 28 27.3	8.135
11	2 3 49.74	1.9422	16 19 23.2	12.204	11	3 44 16.03	2.2543	24 36 31.9	8.017
12	2 5 46.44	1.9477	16 31 33.7	12.146	12	3 46 31.49	2.2610	24 44 29.3	7.897
13	2 7 43.47	1.9533	16 43 40.7	12.086	13	3 48 47.35	2.2678	24 52 19.5	7.776
14	2 9 40.84	1.9590	16 55 44.0	12.025	14	3 51 3.63	2.2747	25 0 2.4	7.653
15	2 11 38.55	1.9647	17 7 43.7	11.963	15	3 53 20.31	2.2813	25 7 37.8	7.528
16	2 13 36.60	1.9704	17 19 39.6	11.900	16	3 55 37.39	2.2881	25 15 5.8	7.403
17	2 15 35.00	1.9762	17 31 31.7	11.837	17	3 57 54.88	2.2948	25 22 26.2	7.277
18	2 17 33.75	1.9822	17 43 20.0	11.772	18	4 0 12.77	2.3015	25 29 39.0	7.149
19	2 19 32.86	1.9881	17 55 4.3	11.705	19	4 2 31.06	2.3081	25 36 44.1	7.020
20	2 21 32.32	1.9940	18 6 44.6	11.637	20	4 4 49.74	2.3146	25 43 41.4	6.888
21	2 23 32.14	2.0001	18 18 20.8	11.569	21	4 7 8.81	2.3212	25 50 30.7	6.756
22	2 25 32.33	2.0062	18 29 52.9	11.500	22	4 9 28.28	2.3277	25 57 12.1	6.623
23	2 27 32.88	2.0123	N.18 41 20.8	11.429	23	4 11 48.13	2.3341	N.26 3 45.5	6.489
	WEDNESDAY 10.					FRIDAY 12.			
0	2 29 33.81	2.0186	N.18 52 44.4	11.357	0	4 14 8.37	2.3405	N.26 10 10.8	6.353
1	2 31 35.11	2.0248	19 4 3.6	11.283	1	4 16 28.99	2.3468	26 16 27.8	6.215
2	2 33 36.78	2.0310	19 15 18.4	11.208	2	4 18 49.98	2.3530	26 22 36.6	6.077
3	2 35 38.83	2.0373	19 26 28.7	11.132	3	4 21 11.35	2.3593	26 28 37.0	5.937
4	2 37 41.26	2.0437	19 37 34.3	11.056	4	4 23 33.09	2.3653	26 34 29.0	5.795
5	2 39 44.08	2.0502	19 48 35.3	10.978	5	4 25 55.19	2.3714	26 40 12.4	5.652
6	2 41 47.28	2.0566	19 59 31.6	10.898	6	4 28 17.66	2.3774	26 45 47.3	5.509
7	2 43 50.87	2.0631	20 10 23.1	10.817	7	4 30 40.48	2.3833	26 51 13.5	5.364
8	2 45 54.85	2.0697	20 21 9.7	10.735	8	4 33 3.66	2.3892	26 56 31.0	5.218
9	2 47 59.23	2.0762	20 31 51.3	10.652	9	4 35 27.18	2.3949	27 1 39.6	5.070
10	2 50 4.00	2.0828	20 42 27.9	10.567	10	4 37 51.05	2.4006	27 6 39.4	4.922
11	2 52 9.17	2.0895	20 52 59.3	10.481	11	4 40 15.25	2.4061	27 11 30.3	4.772
12	2 54 14.74	2.0962	21 3 25.6	10.394	12	4 42 39.78	2.4116	27 16 12.1	4.621
13	2 56 20.71	2.1028	21 13 46.6	10.306	13	4 45 4.64	2.4171	27 20 44.8	4.469
14	2 58 27.08	2.1096	21 24 2.3	10.216	14	4 47 29.83	2.4224	27 25 8.4	4.317
15	3 0 33.86	2.1164	21 34 12.5	10.124	15	4 49 55.33	2.4276	27 29 22.8	4.163
16	3 2 41.05	2.1232	21 44 17.2	10.032	16	4 52 21.14	2.4327	27 33 27.9	4.007
17	3 4 48.64	2.1300	21 54 16.3	9.938	17	4 54 47.25	2.4377	27 37 23.6	3.850
18	3 6 56.65	2.1368	22 4 9.7	9.843	18	4 57 13.66	2.4426	27 41 9.9	3.692
19	3 9 5.06	2.1437	22 13 57.4	9.747	19	4 59 40.36	2.4473	27 44 46.7	3.534
20	3 11 13.89	2.1506	22 23 39.3	9.648	20	5 2 7.34	2.4520	27 48 14.0	3.375
21	3 13 23.13	2.1574	22 33 15.2	9.549	21	5 4 34.60	2.4567	27 51 31.7	3.214
22	3 15 32.78	2.1643	22 42 45.2	9.449	22	5 7 2.14	2.4612	27 54 39.7	3.053
23	3 17 42.85	2.1712	22 52 9.1	9.347	23	5 9 29.94	2.4654	27 57 38.0	2.891
24	3 19 53.33	2.1781	N.23 1 26.8	9.243	24	5 11 57.99	2.4697	N.28 0 26.6	2.728

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 13.					MONDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	5 11 57.99	2.4697	N.28 0 26.6	2.728	0	7 12 42.85	2.5059	N.26 53 12.5	5.578
1	5 14 26.29	2.4738	28 3 5.3	2.563	1	7 15 13.12	2.5031	26 47 32.8	5.746
2	5 16 54.84	2.4777	28 5 34.1	2.398	2	7 17 43.22	2.5003	26 41 43.0	5.914
3	5 19 23.62	2.4815	28 7 53.0	2.232	3	7 20 13.15	2.4974	26 35 43.1	6.082
4	5 21 52.62	2.4852	28 10 2.0	2.065	4	7 22 42.91	2.4943	26 29 33.1	6.250
5	5 24 21.84	2.4888	28 12 0.9	1.898	5	7 25 12.48	2.4912	26 23 13.1	6.416
6	5 26 51.27	2.4922	28 13 49.8	1.731	6	7 27 41.86	2.4880	26 16 43.2	6.581
7	5 29 20.90	2.4955	28 15 28 6	1.562	7	7 30 11.04	2.4847	26 10 3.4	6.745
8	5 31 50.73	2.4987	28 16 57.2	1.392	8	7 32 40.02	2.4813	26 3 13.8	6.909
9	5 34 20.75	2.5017	28 18 15.6	1.222	9	7 35 8.79	2.4777	25 56 14.3	7.072
10	5 36 50.94	2.5046	28 19 23.8	1.051	10	7 37 37.34	2.4740	25 49 5.1	7.234
11	5 39 21.30	2.5073	28 20 21.7	0.880	11	7 40 5.67	2.4703	25 41 46.2	7.395
12	5 41 51.82	2.5099	28 21 9.4	0.708	12	7 42 33.78	2.4665	25 34 17.7	7.555
13	5 44 22.49	2.5124	28 21 46.7	0.535	13	7 45 1.65	2.4625	25 26 39.6	7.714
14	5 46 53.31	2.5147	28 22 13.6	0.362	14	7 47 29.28	2.4585	25 18 52.0	7.872
15	5 49 24.26	2.5169	28 22 30.1	0.188	15	7 49 56.67	2.4544	25 10 55.0	8.028
16	5 51 55.34	2.5189	28 22 36.2	+0.015	16	7 52 23.81	2.4502	25 2 48.6	8.184
17	5 54 26.54	2.5208	28 22 31.9	−0.159	17	7 54 50.70	2.4460	24 54 32.9	8.339
18	5 56 57.84	2.5226	28 22 17.1	0.334	18	7 57 17.33	2.4417	24 46 7.9	8.493
19	5 59 29.24	2.5241	28 21 51.8	0.509	19	7 59 43.70	2.4573	24 37 33.7	8.646
20	6 2 0.73	2.5255	28 21 16.0	0.684	20	8 2 9.80	2.4328	24 28 50.4	8.797
21	6 4 32.30	2.5268	28 20 29.7	0.860	21	8 4 35.64	2.4283	24 19 58.1	8.947
22	6 7 3.94	2.5279	28 19 32.8	1.037	22	8 7 1.20	2.4238	24 10 56.8	9.096
23	6 9 35.65	2.5290	N.28 18 25.3	1.212	23	8 9 26.49	2.4191	N.24 1 46.6	9.244
	SUNDAY 14.					TUESDAY 16.			
0	6 12 7.42	2.5298	N.28 17 7.3	1.388	0	8 11 51.49	2.4143	N.23 52 27.5	9.391
1	6 14 39.23	2.5305	28 15 38.7	1.565	1	8 14 16.21	2.4097	23 42 59.7	9.536
2	6 17 11.08	2.5310	28 13 59.5	1.742	2	8 16 40.65	2.4049	23 33 23.2	9.680
3	6 19 42.95	2.5313	28 12 9.7	1.918	3	8 19 4.80	2.4001	23 23 38.1	9.822
4	6 22 14.84	2.5315	28 10 9.4	2.093	4	8 21 28.66	2.3952	23 13 44.5	9.964
5	6 24 46.73	2.5316	28 7 58.5	2.271	5	8 23 52.22	2.3903	23 3 42.4	10.105
6	6 27 18.63	2.5316	28 5 36.9	2.447	6	8 26 15.49	2.3853	22 53 31.9	10.243
7	6 29 50.52	2.5313	28 3 4.8	2.623	7	8 28 38.46	2.3803	22 43 13.2	10.381
8	6 32 22.39	2.5309	28 0 22.1	2.800	8	8 31 1.13	2.3753	22 32 46.2	10.518
9	6 34 54.23	2.5304	27 57 28.8	2.976	9	8 33 23.50	2.3703	22 22 11.1	10.653
10	6 37 26.04	2.5298	27 54 25.0	3.152	10	8 35 45.56	2.3652	22 11 27.9	10.786
11	6 39 57.81	2.5290	27 51 10.6	3.328	11	8 38 7.32	2.3601	22 0 36.8	10.917
12	6 42 29.52	2.5279	27 47 45.7	3.503	12	8 40 28.77	2.3549	21 49 37.8	11.048
13	6 45 1.16	2.5268	27 44 10.3	3.678	13	8 42 49.91	2.3498	21 38 31.0	11.178
14	6 47 32.73	2.5255	27 40 24.3	3.853	14	8 45 10.75	2.3447	21 27 16.5	11.306
15	6 50 4.22	2.5242	27 36 27.9	4.028	15	8 47 31.28	2.3396	21 15 54.3	11.433
16	6 52 35.63	2.5227	27 32 21.0	4.202	16	8 49 51.50	2.3344	21 4 24.6	11.558
17	6 55 6.95	2.5211	27 28 3.7	4.376	17	8 52 11.41	2.3293	20 52 47.4	11.682
18	6 57 38.16	2.5193	27 23 35.9	4.549	18	8 54 31.01	2.3241	20 41 2.8	11.804
19	7 0 9.26	2.5173	27 18 57.8	4.722	19	8 56 50.30	2.3189	20 29 10.9	11.924
20	7 2 40.24	2.5153	27 14 9.3	4.894	20	8 59 9.28	2.3138	20 17 11.9	12.043
21	7 5 11.10	2.5132	27 9 10.5	5.066	21	9 1 27.95	2.3086	20 5 5.7	12.162
22	7 7 41.83	2.5109	27 4 1.4	5.237	22	9 3 46.31	2.3034	19 52 52.5	12.278
23	7 10 12.42	2.5085	26 58 42.1	5.408	23	9 6 4.36	2.2983	19 40 32.3	12.393
24	7 12 42.85	2.5059	N.26 53 12.5	5.578	24	9 8 22.10	2.2932	N.19 28 5.3	12.507

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 17.					FRIDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	9 8 22.10	2.2932	N.19 28 5.3	12.507	0	10 53 17.22	2.1012	N. 7 45 24.4	16.199
1	9 10 39.54	2.2881	19 15 31.5	12.619	1	10 55 23.22	2.0988	7 29 11.2	16.240
2	9 12 56.67	2.2830	19 2 51.0	12.729	2	10 57 29.08	2.0967	7 12 55.6	16.279
3	9 15 13.50	2.2780	18 50 4.0	12.837	3	10 59 34.82	2.0946	6 56 37.7	16.317
4	9 17 30.03	2.2729	18 37 10.4	12.944	4	11 1 40.43	2.0925	6 40 17.5	16.354
5	9 19 46.25	2.2678	18 24 10.5	13.052	5	11 3 45.92	2.0905	6 23 55.2	16.388
6	9 22 2.17	2.2628	18 11 4.2	13.157	6	11 5 51.29	2.0887	6 7 30.9	16.422
7	9 24 17.79	2.2579	17 57 51.7	13.260	7	11 7 56.56	2.0869	5 51 4.6	16.455
8	9 26 33.12	2.2531	17 44 33.0	13.362	8	11 10 1.72	2.0853	5 34 36.4	16.486
9	9 28 48.16	2.2482	17 31 8.3	13.462	9	11 12 6.79	2.0837	5 18 6.3	16.515
10	9 31 2.90	2.2433	17 17 37.6	13.561	10	11 14 11.76	2.0821	5 1 34.5	16.543
11	9 33 17.35	2.2384	17 4 1.0	13.658	11	11 16 16.64	2.0807	4 45 1.1	16.569
12	9 35 31.51	2.2337	16 50 18.7	13.753	12	11 18 21.44	2.0793	4 28 26.2	16.594
13	9 37 45.39	2.2289	16 36 30.7	13.847	13	11 20 26.16	2.0781	4 11 49.8	16.618
14	9 39 58.98	2.2242	16 22 37.0	13.940	14	11 22 30.81	2.0769	3 55 12.0	16.640
15	9 42 12.29	2.2196	16 8 37.9	14.030	15	11 24 35.39	2.0758	3 38 33.0	16.661
16	9 44 25.33	2.2150	15 54 33.4	14.120	16	11 26 39.91	2.0749	3 21 52.7	16.681
17	9 46 38.09	2.2104	15 40 23.5	14.208	17	11 28 44.38	2.0741	3 5 11.3	16.698
18	9 48 50.58	2.2059	15 26 8.4	14.294	18	11 30 48.80	2.0733	2 48 28.9	16.715
19	9 51 2.80	2.2015	15 11 48.2	14.379	19	11 32 53.17	2.0725	2 31 45.5	16.730
20	9 53 14.76	2.1971	14 57 22.9	14.463	20	11 34 57.50	2.0719	2 15 1.3	16.743
21	9 55 26.45	2.1927	14 42 52.6	14.545	21	11 37 1.80	2.0714	1 58 16.3	16.756
22	9 57 37.88	2.1884	14 28 17.5	14.625	22	11 39 6.07	2.0710	1 41 30.6	16.767
23	9 59 49.06	2.1842	N.14 13 37.6	14.705	23	11 41 10.32	2.0707	N. 1 24 44.3	16.777
	THURSDAY 18.					SATURDAY 20.			
0	10 1 59.98	2.1800	N.13 58 53.0	14.783	0	11 43 14.56	2.0705	N. 1 7 57.4	16.785
1	10 4 10.66	2.1759	13 44 3.7	14.858	1	11 45 18.78	2.0703	0 51 10.1	16.791
2	10 6 21.09	2.1718	13 29 9.9	14.933	2	11 47 23.00	2.0703	0 34 22.5	16.796
3	10 8 31.28	2.1679	13 14 11.7	15.006	3	11 49 27.22	2.0704	0 17 34.6	16.800
4	10 10 41.24	2.1640	12 59 9.2	15.078	4	11 51 31.45	2.0705	N. 0 0 46.5	16.802
5	10 12 50.96	2.1601	12 44 2.4	15.148	5	11 53 35.68	2.0707	S. 0 16 1.7	16.803
6	10 15 0.45	2.1563	12 28 51.5	15.216	6	11 55 39.93	2.0711	0 32 49.9	16.803
7	10 17 9.72	2.1527	12 13 36.5	15.283	7	11 57 44.21	2.0715	0 49 38.1	16.802
8	10 19 18.77	2.1490	11 58 17.5	15.348	8	11 59 48.51	2.0720	1 6 26.1	16.798
9	10 21 27.60	2.1455	11 42 54.7	15.413	9	12 1 52.85	2.0727	1 23 13.8	16.793
10	10 23 36.23	2.1421	11 27 28.0	15.476	10	12 3 57.23	2.0733	1 40 1.2	16.787
11	10 25 44.65	2.1385	11 11 57.6	15.537	11	12 6 1.65	2.0742	1 56 48.3	16.780
12	10 27 52.85	2.1351	10 56 23.6	15.597	12	12 8 6.13	2.0751	2 13 34.8	16.770
13	10 30 0.86	2.1319	10 40 46.0	15.655	13	12 10 10.66	2.0760	2 30 20.7	16.760
14	10 32 8.68	2.1287	10 25 5.0	15.711	14	12 12 15.25	2.0771	2 47 6.0	16.758
15	10 34 16.31	2.1256	10 9 20.6	15.767	15	12 14 19.91	2.0783	3 3 50.5	16.735
16	10 36 23.75	2.1225	9 53 33.0	15.821	16	12 16 24.65	2.0796	3 20 34.2	16.720
17	10 38 31.01	2.1196	9 37 42.2	15.873	17	12 18 29.46	2.0809	3 37 16.9	16.703
18	10 40 38.10	2.1167	9 21 48.3	15.924	18	12 20 34.36	2.0824	3 53 58.6	16.686
19	10 42 45.02	2.1139	9 5 51.3	15.974	19	12 22 39.35	2.0839	4 10 39.2	16.667
20	10 44 51.77	2.1112	8 49 51.4	16.022	20	12 24 44.43	2.0855	4 27 18.7	16.647
21	10 46 58.36	2.1086	8 33 48.7	16.068	21	12 26 49.61	2.0873	4 43 56.8	16.624
22	10 49 4.80	2.1060	8 17 43.2	16.113	22	12 28 54.90	2.0891	5 0 33.6	16.602
23	10 51 11.08	2.1035	8 1 35.1	16.157	23	12 31 0.30	2.0910	5 17 9.0	16.577
24	10 53 17.22	2.1012	N. 7 45 24.4	16.199	24	12 33 5.82	2.0930	S. 5 33 42.8	16.550

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 21.					TUESDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	12 33 5.82	2.0930	S. 5 33 42.8	16.550	0	14 17 26.39	2.2818	S. 17 49 1.9	13.489
1	12 35 11.46	2.0951	5 50 15.0	16.522	1	14 19 43.46	2.2872	18 2 28.2	13.387
2	12 37 17.23	2.0973	6 6 45.4	16.493	2	14 22 0.86	2.2927	18 15 48.3	13.283
3	12 39 23.14	2.0996	6 23 14.1	16.462	3	14 24 18.59	2.2982	18 29 2.1	13.177
4	12 41 29.18	2.1019	6 39 40.9	16.430	4	14 26 36.64	2.3037	18 42 9.5	13.069
5	12 43 35.37	2.1044	6 56 5.7	16.396	5	14 28 55.03	2.3092	18 55 10.4	12.960
6	12 45 41.71	2.1069	7 12 28.4	16.360	6	14 31 13.75	2.3147	19 8 4.7	12.850
7	12 47 48.20	2.1095	7 28 48.9	16.323	7	14 33 32.80	2.3203	19 20 52.4	12.737
8	12 49 54.85	2.1123	7 45 7.2	16.286	8	14 35 52.19	2.3259	19 33 33.2	12.623
9	12 52 1.67	2.1150	8 1 23.2	16.247	9	14 38 11.91	2.3314	19 46 7.2	12.508
10	12 54 8.65	2.1178	8 17 36.8	16.205	10	14 40 31.96	2.3370	19 58 34.2	12.391
11	12 56 15.81	2.1209	8 33 47.8	16.162	11	14 42 52.35	2.3427	20 10 54.1	12.272
12	12 58 23.16	2.1240	8 49 56.3	16.118	12	14 45 13.08	2.3483	20 23 6.9	12.152
13	13 0 30.69	2.1271	9 6 2.0	16.073	13	14 47 34.15	2.3539	20 35 12.4	12.030
14	13 2 38.41	2.1303	9 22 5.0	16.026	14	14 49 55.55	2.3595	20 47 10.5	11.907
15	13 4 46.32	2.1336	9 38 5.1	15.977	15	14 52 17.29	2.3652	20 59 1.2	11.782
16	13 6 54.44	2.1370	9 54 2.2	15.926	16	14 54 39.37	2.3708	21 10 44.3	11.655
17	13 9 2.76	2.1404	10 9 56.2	15.874	17	14 57 1.78	2.3763	21 22 19.8	11.527
18	13 11 11.29	2.1440	10 25 47.1	15.821	18	14 59 24.53	2.3819	21 33 47.6	11.397
19	13 13 20.04	2.1476	10 41 34.7	15.766	19	15 1 47.61	2.3875	21 45 7.5	11.266
20	13 15 29.00	2.1513	10 57 19.0	15.710	20	15 4 11.03	2.3931	21 56 19.5	11.133
21	13 17 38.19	2.1551	11 12 59.9	15.652	21	15 6 34.78	2.3987	22 7 23.5	11.000
22	13 19 47.61	2.1590	11 28 37.2	15.592	22	15 8 58.87	2.4042	22 18 19.4	10.864
23	13 21 57.27	2.1629	S. 11 44 10.9	15.532	23	15 11 23.28	2.4097	S. 22 29 7.2	10.727
	MONDAY 22.					WEDNESDAY 24.			
0	13 24 7.16	2.1669	S. 11 59 41.0	15.469	0	15 13 48.03	2.4152	S. 22 39 46.7	10.588
1	13 26 17.30	2.1710	12 15 7.2	15.404	1	15 16 13.10	2.4206	22 50 17.8	10.448
2	13 28 27.68	2.1751	12 30 29.5	15.338	2	15 18 38.50	2.4260	23 0 40.4	10.306
3	13 30 38.31	2.1793	12 45 47.8	15.272	3	15 21 4.22	2.4313	23 10 54.5	10.163
4	13 32 49.20	2.1837	13 1 2.0	15.203	4	15 23 30.26	2.4366	23 20 59.9	10.018
5	13 35 0.35	2.1881	13 16 12.1	15.132	5	15 25 56.61	2.4418	23 30 56.7	9.872
6	13 37 11.77	2.1925	13 31 17.9	15.060	6	15 28 23.28	2.4472	23 40 44.6	9.725
7	13 39 23.45	2.1969	13 46 19.3	14.987	7	15 30 50.27	2.4523	23 50 23.7	9.577
8	13 41 35.40	2.2014	14 1 16.3	14.912	8	15 33 17.56	2.4574	23 59 53.8	9.427
9	13 43 47.62	2.2061	14 16 8.7	14.834	9	15 35 45.16	2.4624	24 9 14.9	9.275
10	13 46 0.13	2.2108	14 30 56.4	14.756	10	15 38 13.05	2.4674	24 18 26.8	9.122
11	13 48 12.92	2.2155	14 45 39.4	14.677	11	15 40 41.25	2.4724	24 27 29.5	8.968
12	13 50 25.99	2.2203	15 0 17.6	14.595	12	15 43 9.74	2.4773	24 36 23.0	8.813
13	13 52 39.35	2.2252	15 14 50.8	14.511	13	15 45 38.52	2.4821	24 45 7.1	8.657
14	13 54 53.01	2.2302	15 29 18.9	14.426	14	15 48 7.59	2.4868	24 53 41.8	8.498
15	13 57 6.97	2.2351	15 43 41.9	14.340	15	15 50 36.94	2.4914	25 2 6.9	8.339
16	13 59 21.22	2.2401	15 57 59.7	14.252	16	15 53 6.56	2.4959	25 10 22.5	8.179
17	14 1 35.78	2.2452	16 12 12.1	14.162	17	15 55 36.45	2.5004	25 18 28.4	8.017
18	14 3 50.64	2.2503	16 26 19.1	14.071	18	15 58 6.61	2.5048	25 26 24.5	7.854
19	14 6 5.81	2.2555	16 40 20.6	13.978	19	16 0 37.03	2.5091	25 34 10.9	7.691
20	14 8 21.30	2.2607	16 54 16.5	13.884	20	16 3 7.70	2.5132	25 41 47.4	7.526
21	14 10 37.10	2.2659	17 8 6.7	13.788	21	16 5 38.62	2.5173	25 49 14.0	7.361
22	14 12 53.21	2.2712	17 21 51.1	13.690	22	16 8 9.78	2.5213	25 56 30.7	7.194
23	14 15 9.64	2.2765	17 35 29.5	13.591	23	16 10 41.18	2.5252	26 3 37.3	7.025
24	14 17 26.39	2.2818	S. 17 49 1.9	13.489	24	16 13 12.81	2.5290	S. 26 10 33.7	6.856

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 25.					SATURDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	16 13 12.81	2.5290	S. 26 10 33.7	6.856	0	18 16 20.00	2.5414	S. 28 14 2.1	1.758
1	16 15 44.66	2.5327	26 17 20.0	6.686	1	18 18 52.38	2.5378	28 12 11.3	1.933
2	16 18 16.73	2.5363	26 23 56.0	6.515	2	18 21 24.54	2.5342	28 10 10.1	2.107
3	16 20 49.01	2.5397	26 30 21.8	6.344	3	18 23 56.48	2.5303	28 7 58.5	2.281
4	16 23 21.49	2.5429	26 36 37.3	6.172	4	18 26 28.17	2.5262	28 5 36.5	2.453
5	16 25 54.16	2.5462	26 42 42.4	5.998	5	18 28 59.62	2.5221	28 3 4.1	2.624
6	16 28 27.03	2.5492	26 48 37.0	5.823	6	18 31 30.82	2.5178	28 0 21.5	2.795
7	16 31 0.07	2.5521	26 54 21.1	5.648	7	18 34 1.76	2.5134	27 57 28.7	2.964
8	16 33 33.28	2.5549	26 59 54.7	5.472	8	18 36 32.43	2.5088	27 54 25.8	3.133
9	16 36 6.66	2.5577	27 5 17.7	5.295	9	18 39 2.82	2.5042	27 51 12.8	3.301
10	16 38 40.20	2.5602	27 10 30.1	5.118	10	18 41 32.93	2.4993	27 47 49.7	3.468
11	16 41 13.88	2.5625	27 15 31.9	4.941	11	18 44 2.74	2.4944	27 44 16.7	3.633
12	16 43 47.70	2.5648	27 20 23.0	4.762	12	18 46 32.26	2.4894	27 40 33.8	3.797
13	16 46 21.65	2.5669	27 25 3.3	4.583	13	18 49 1.47	2.4842	27 36 41.0	3.961
14	16 48 55.73	2.5689	27 29 32.9	4.403	14	18 51 30.36	2.4788	27 32 38.5	4.123
15	16 51 29.92	2.5707	27 33 51.6	4.222	15	18 53 58.93	2.4735	27 28 26.3	4.284
16	16 54 4.22	2.5724	27 37 59.5	4.042	16	18 56 27.18	2.4680	27 24 4.5	4.443
17	16 56 38.61	2.5739	27 41 56.6	3.861	17	18 58 55.09	2.4623	27 19 33.1	4.602
18	16 59 13.09	2.5752	27 45 42.8	3.679	18	19 1 22.66	2.4567	27 14 52.2	4.760
19	17 1 47.64	2.5764	27 49 18.1	3.497	19	19 3 49.89	2.4508	27 10 1.9	4.916
20	17 4 22.26	2.5775	27 52 42.5	3.315	20	19 6 16.76	2.4449	27 5 2.3	5.071
21	17 6 56.94	2.5785	27 55 55.9	3.133	21	19 8 43.28	2.4390	26 59 53.4	5.225
22	17 9 31.68	2.5792	27 58 58.4	2.950	22	19 11 9.44	2.4328	26 54 35.3	5.377
23	17 12 6.45	2.5798	S. 28 1 49.9	2.767	23	19 13 35.22	2.4266	S. 26 49 8.1	5.528
	FRIDAY 26.					SUNDAY 28.			
0	17 14 41.25	2.5802	S. 28 4 30.5	2.584	0	19 16 0.63	2.4203	S. 26 43 31.9	5.678
1	17 17 16.07	2.5804	28 7 0.0	2.401	1	19 18 25.66	2.4140	26 37 46.7	5.827
2	17 19 50.90	2.5805	28 9 18.6	2.218	2	19 20 50.31	2.4076	26 31 52.7	5.973
3	17 22 25.73	2.5804	28 11 26.1	2.034	3	19 23 14.57	2.4011	26 25 49.9	6.119
4	17 25 0.55	2.5802	28 13 22.7	1.852	4	19 25 38.44	2.3946	26 19 38.4	6.265
5	17 27 35.35	2.5798	28 15 8.3	1.668	5	19 28 1.92	2.3879	26 13 18.3	6.406
6	17 30 10.13	2.5792	28 16 42.9	1.485	6	19 30 24.99	2.3812	26 6 49.7	6.547
7	17 32 44.86	2.5785	28 18 6.5	1.302	7	19 32 47.66	2.3744	26 0 12.6	6.688
8	17 35 19.55	2.5777	28 19 19.1	1.118	8	19 35 9.92	2.3676	25 53 27.1	6.827
9	17 37 54.18	2.5766	28 20 20.7	0.936	9	19 37 31.77	2.3607	25 46 33.4	6.963
10	17 40 28.74	2.5754	28 21 11.4	0.753	10	19 39 53.20	2.3537	25 39 31.5	7.099
11	17 43 3.23	2.5741	28 21 51.1	0.571	11	19 42 14.21	2.3467	25 32 21.5	7.234
12	17 45 37.63	2.5725	28 22 19.9	0.389	12	19 44 34.81	2.3397	25 25 3.4	7.367
13	17 48 11.93	2.5707	28 22 37.8	0.207	13	19 46 54.98	2.3326	25 17 37.4	7.498
14	17 50 46.12	2.5688	28 22 44.8	−0.026	14	19 49 14.72	2.3255	25 10 3.6	7.628
15	17 53 20.19	2.5668	28 22 40.9	+0.155	15	19 51 34.04	2.3184	25 2 22.0	7.757
16	17 55 54.13	2.5646	28 22 26.2	0.336	16	19 53 52.93	2.3112	24 54 32.8	7.883
17	17 58 27.94	2.5623	28 22 0.6	0.516	17	19 56 11.39	2.3040	24 46 36.0	8.009
18	18 1 1.61	2.5598	28 21 24.3	0.694	18	19 58 29.41	2.2967	24 38 31.7	8.133
19	18 3 35.12	2.5571	28 20 37.3	0.873	19	20 0 46.99	2.2894	24 30 20.0	8.256
20	18 6 8.46	2.5543	28 19 39.5	1.052	20	20 3 4.14	2.2822	24 22 1.0	8.377
21	18 8 41.63	2.5513	28 18 31.1	1.229	21	20 5 20.85	2.2748	24 13 34.8	8.496
22	18 11 14.61	2.5482	28 17 12.0	1.407	22	20 7 37.12	2.2675	24 5 1.5	8.614
23	18 13 47.41	2.5449	28 15 42.3	1.583	23	20 9 52.95	2.2602	23 56 21.1	8.731
24	18 16 20.00	2.5414	S. 28 14 2.1	1.758	24	20 12 8.34	2.2528	S. 23 47 33.8	8.846

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 29.			
	h m s	s	° ′ ″	″
0	20 12 8.34	2.2528	S. 23 47 33.8	8.846
1	20 14 23.29	2.2455	23 38 39.6	8.959
2	20 16 37.80	2.2382	23 29 38.7	9.071
3	20 18 51.87	2.2308	23 20 31.1	9.182
4	20 21 5.50	2.2234	23 11 16.9	9.291
5	20 23 18.68	2.2161	23 1 56.2	9.398
6	20 25 31.43	2.2088	22 52 29.1	9.504
7	20 27 43.73	2.2014	22 42 55.7	9.608
8	20 29 55.60	2.1941	22 33 16.1	9.712
9	20 32 7.02	2.1867	22 23 30.3	9.814
10	20 34 18.00	2.1794	22 13 38.4	9.914
11	20 36 28.55	2.1722	22 3 40.6	10.013
12	20 38 38.66	2.1648	21 53 36.8	10.111
13	20 40 48.33	2.1576	21 43 27.3	10.206
14	20 42 57.57	2.1504	21 33 12.1	10.301
15	20 45 6.38	2.1433	21 22 51.2	10.393
16	20 47 14.76	2.1361	21 12 24.9	10.484
17	20 49 22.71	2.1289	21 1 53.1	10.575
18	20 51 30.23	2.1218	20 51 15.9	10.664
19	20 53 37.33	2.1147	20 40 33.4	10.752
20	20 55 44.00	2.1077	20 29 45.7	10.838
21	20 57 50.25	2.1007	20 18 52.9	10.922
22	20 59 56.08	2.0938	20 7 55.1	11.005
23	21 2 1.50	2.0868	S. 19 56 52.3	11.087
	TUESDAY 30.			
0	21 4 6.50	2.0799	S. 19 45 44.7	11.167
1	21 6 11.09	2.0731	19 34 32.3	11.247
2	21 8 15.27	2.0663	19 23 15.1	11.324
3	21 10 19.05	2.0596	19 11 53.4	11.400
4	21 12 22.42	2.0528	19 0 27.1	11.476
5	21 14 25.39	2.0462	18 48 56.3	11.549
6	21 16 27.97	2.0397	18 37 21.2	11.621
7	21 18 30.15	2.0331	18 25 41.8	11.693
8	21 20 31.94	2.0266	18 13 58.1	11.763
9	21 22 33.34	2.0202	18 2 10.3	11.831
10	21 24 34.36	2.0138	17 50 18.4	11.898
11	21 26 34.99	2.0074	17 38 22.5	11.965
12	21 28 35.25	2.0012	17 26 22.6	12.030
13	21 30 35.13	1.9949	17 14 18.9	12.093
14	21 32 34.64	1.9888	17 2 11.4	12.156
15	21 34 33.79	1.9827	16 50 0.2	12.217
16	21 36 32.57	1.9767	16 37 45.4	12.277
17	21 38 30.99	1.9708	16 25 27.0	12.336
18	21 40 29 06	1.9649	16 13 5.1	12.393
19	21 42 26.78	1.9591	16 0 39.8	12.450
20	21 44 24.15	1.9533	15 48 11.1	12.506
21	21 46 21.17	1.9475	15 35 39.1	12.560
22	21 48 17.85	1.9419	15 23 3.9	12.613
23	21 50 14.20	1.9363	15 10 25.5	12.665
24	21 52 10.21	1.9308	S. 14 57 44.1	12.716
	WEDNESDAY 31.			
	h m s	s	° ′ ″	″
0	21 52 10.21	1.9308	S. 14 57 44.1	12.716
1	21 54 5.90	1.9254	14 44 59.6	12.766
2	21 56 1.26	1.9200	14 32 12.2	12.814
3	21 57 56.30	1.9148	14 19 21.9	12.862
4	21 59 51.03	1.9096	14 6 28.7	12.909
5	22 1 45.45	1.9044	13 53 32.8	12.954
6	22 3 39.56	1.8993	13 40 34.2	12.998
7	22 5 33.37	1.8944	13 27 32.9	13.042
8	22 7 26.89	1.8895	13 14 29.1	13.085
9	22 9 20.11	1.8846	13 1 22.8	13.126
10	22 11 13.04	1.8798	12 48 14.0	13.167
11	22 13 5.69	1.8751	12 35 2.8	13.207
12	22 14 58.05	1.8704	12 21 49.2	13.245
13	22 16 50.14	1.8659	12 8 33.4	13.282
14	22 18 41.96	1.8614	11 55 15.3	13.319
15	22 20 33.51	1.8570	11 41 55.1	13.355
16	22 22 24.80	1.8527	11 28 32.7	13.390
17	22 24 15.83	1.8484	11 15 8.3	13.423
18	22 26 6.61	1.8442	11 1 41.9	13.457
19	22 27 57.14	1.8401	10 48 13.5	13.488
20	22 29 47.42	1.8361	10 34 43.3	13.519
21	22 31 37.47	1.8322	10 21 11.2	13.549
22	22 33 27.28	1.8283	10 7 37.4	13.578
23	22 35 16.86	1.8245	S. 9 54 1.8	13.607
	THURSDAY, JAN. 1, 1914.			
0	22 37 6.22	1.8208	S. 9 40 24.6	13.634

PHASES OF THE MOON.

			d	h	m
☽	First Quarter . .	Dec.	5	2	58.7
○	Full Moon		13	3	0.3
☾	Last Quarter		20	4	15.6
●	New Moon		27	2	58.7

			d	h
☾	Apogee	Dec.	6	11.1
☾	Perigee		21	2.4

MERCURY, 1913.

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	17 10 47.61	+12.680	−21 33 52.5	−36.63	22 29.8	1	20 27 5.05	+17.244	−21 8 32.9	+ 52.31	23 45.7
2	17 15 56.82	13.081	21 48 18.1	35.46	22 31.2	2	20 33 59.30	17.275	20 46 53.8	55.95	23 48.6
3	17 21 15.22	13.446	22 2 12.9	34.05	22 32.7	3	20 40 54.26	17.303	20 23 47.1	59.61	23 51.6
4	17 26 41.98	13.778	22 15 31.1	32.42	22 34.3	4	20 47 49.85	17.328	19 59 12.5	63.28	23 54.7
5	17 32 16.35	14.081	22 28 7.8	30.60	22 36.0	5	20 54 46.01	17.351	19 33 9.9	66.96	23 57.7
6	17 37 57.66	+14.357	−22 39 58.6	−28.60	22 37.9	6	21 1 42.69	+17.371	−19 5 38.9	+ 70.64	. . .
7	17 43 45.32	14.610	22 50 59.3	26.44	22 39.9	7	21 8 39.83	17.389	18 36 39.4	74.32	0 0.7
8	17 49 38.81	14.843	23 1 6.5	24.14	22 41.9	8	21 15 37.36	17.405	18 6 11.3	78.01	0 3.7
9	17 55 37.65	15.057	23 10 17.0	21.71	22 44.0	9	21 22 35.24	17.418	17 34 14.7	81.70	0 6.7
10	18 1 41.42	15.254	23 18 27.8	19.17	22 46.2	10	21 29 33.41	17.429	17 0 49.8	85.38	0 9.8
11	18 7 49.72	+15.435	−23 25 36.4	−16.53	22 48.4	11	21 36 31.80	+17.437	−16 25 56.8	+ 89.04	0 12.8
12	18 14 2.21	15.603	23 31 40.5	13.79	22 50.7	12	21 43 30.33	17.441	15 49 36.2	92.68	0 15.8
13	18 20 18.58	15.759	23 36 37.9	10.97	22 53.1	13	21 50 28.92	17.442	15 11 48.6	96.29	0 18.9
14	18 26 38.54	15.903	23 40 26.7	8.08	22 55.6	14	21 57 27.48	17.438	14 32 35.0	99.85	0 22.0
15	18 33 1.81	16.036	23 43 5.1	5.11	22 58.1	15	22 4 25.89	17.429	13 51 56.5	103.35	0 25.0
16	18 39 28.16	+16.159	−23 44 31.5	− 2.08	23 0.6	16	22 11 24.01	+17.413	−13 9 54.6	+106.79	0 28.0
17	18 45 57.36	16.273	23 44 44.5	+ 1.01	23 3.2	17	22 18 21.67	17.390	12 26 31.1	110.15	0 31.0
18	18 52 29.20	16.379	23 43 42.6	4.16	23 5.8	18	22 25 18.66	17.357	11 41 48.4	113.39	0 34.0
19	18 59 3.49	16.477	23 41 24.4	7.36	23 8.5	19	22 32 14.72	17.312	10 55 49.4	116.50	0 37.0
20	19 5 40.05	16.568	23 37 48.9	10.60	23 11.2	20	22 39 9.54	17.253	10 8 37.6	119.45	0 40.0
21	19 12 18.72	+16.653	−23 32 55.1	+13.89	23 14.0	21	22 46 2.76	+17.178	− 9 20 17.1	+122.21	0 42.9
22	19 18 59.34	16.731	23 26 41.8	17.22	23 16.8	22	22 52 53.93	17.082	8 30 53.0	124.75	0 45.8
23	19 25 41.76	16.803	23 19 8.0	20.59	23 19.6	23	22 59 42.51	16.962	7 40 31.3	127.01	0 48.7
24	19 32 25.86	16.870	23 10 12.9	24.00	23 22.4	24	23 6 27.87	16.813	6 49 19.1	128.95	0 51.5
25	19 39 11.50	16.932	22 59 55.5	27.45	23 25.2	25	23 13 9.26	16.630	5 57 24.6	130.52	0 54.3
26	19 45 58.56	+16.989	−22 48 15.2	+30.92	23 28.1	26	23 19 45.82	+16.409	− 5 4 57.4	+131.66	0 57.0
27	19 52 46.94	17.042	22 35 11.2	34.42	23 31.0	27	23 26 16.56	16.144	4 12 8.4	132.33	0 59.5
28	19 59 36.53	17.090	22 20 42.8	37.95	23 33.9	28	23 32 40.35	15.829	3 19 9.8	132.46	1 2.0
29	20 6 27.22	17.134	22 4 49.3	41.51	23 36.8	29	23 38 55.91	15.458	2 26 15.3	131.98	1 4.3
30	20 13 18.93	17.175	21 47 30.1	45.09	23 39.7	30	23 45 1.86	15.027	1 33 39.9	130.85	1 6.4
31	20 20 11.57	+17.212	−21 28 44.8	+48.69	23 42.7	31	23 50 56 67	+14.529	− 0 41 40.0	+129.02	1 8.4
32	20 27 5.05	+17.244	−21 8 32.9	+52.31	23 45.7	32	23 56 38.68	+13.960	+ 0 9 26.9	+126.44	1 10.2

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th	31st.
	″	″	″	″	″	″	″
Semidiameter. .	3.05	2.83	2.67	2.56	2.48	2.42	2 39
Horizontal Par. .	8.02	7.45	7.03	6.73	6.51	6.36	6.28

Day of the Month.	5th.	10th.	15th.	20th.	25th.
	″	″	″	″	″
Semidiameter	2.38	2.40	2.44	2.52	2.67
Horizontal Parallax . . .	6.26	6.30	6.41	6.64	7.04

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

MARCH.

Day of Month	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	23 38 55.91	+15.458	−2 26 15.3	+131.98	1 4.3
2	23 45 1.86	15.027	1 33 39.9	130.85	1 6.4
3	23 50 56.67	14.529	−0 41 40.0	129.02	1 8.4
4	23 56 38.68	13.960	+0 9 26.9	126.44	1 10.2
5	0 2 6.18	13.319	0 59 22.6	123.08	1 11.7
6	0 7 17.40	+12.603	+1 47 48.2	+118.92	1 12.9
7	0 12 10.52	11.811	2 34 24.4	113.96	1 13.8
8	0 16 43.74	10.945	3 18 51.9	108.20	1 14.4
9	0 20 55.32	10.008	4 0 51.8	101.66	1 14.7
10	0 24 43.59	9.004	4 40 5.8	94.38	1 14.5
11	0 28 7.00	+ 7.938	+5 16 16.3	+ 86.38	1 13.9
12	0 31 4.19	6.819	5 49 6.8	77.72	1 12.9
13	0 33 33.99	5.657	6 18 22.0	68.45	1 11.4
14	0 35 35.46	4.461	6 43 48.1	58.64	1 9.5
15	0 37 7.95	3.244	7 5 12.9	48.36	1 7.1
16	0 38 11.13	+ 2.021	+7 22 25.9	+ 37.67	1 4.2
17	0 38 45.01	+ 0.805	7 35 18.6	26.68	1 0.8
18	0 38 49.96	− 0.387	7 43 45.0	15.49	0 56.9
19	0 38 26.79	1.535	7 47 41.7	+ 4.23	0 52.6
20	0 37 36.75	2.622	7 47 8.5	− 6.98	0 47.8
21	0 36 21.55	− 3.629	+7 42 8.7	− 17.97	0 42.6
22	0 34 43.31	4.539	7 32 49.4	28.57	0 37.0
23	0 32 44.59	5.333	7 19 22.2	38.59	0 31.1
24	0 30 28.38	5.995	7 2 3.0	47.86	0 24.9
25	0 27 57.98	6.514	6 41 12.0	56.20	0 18.5
26	0 25 16.91	− 6.882	+6 17 13.7	− 63.45	0 11.9
27	0 22 28.88	7.094	5 50 36.0	69.47	0 5.2 23 58.5
28	0 19 37.62	7.151	5 21 49.7	74.16	23 51.7
29	0 16 46.80	7.059	4 51 27.6	77.45	23 45.0
30	0 13 59.91	6.826	4 20 3.2	79.34	23 38.4
31	0 11 20.19	− 6.464	+3 48 9.8	− 79.87	23 32.0
32	0 8 50.55	− 5.988	+3 16 19.4	− 79.12	23 25.8

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.
	″	″	″	″	″	″
Semidiameter . . .	2.91	3.28	3.79	4.42	5.06	5.52
Horizontal Parallax .	7.67	8.63	9.99	11.66	13.34	14.55

APRIL.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	0 8 50.55	− 5.988	+3 16 19.4	−79.12	23 25.8
2	0 6 33.52	5.416	2 45 1.8	77.16	23 19.8
3	0 4 31.19	4.766	2 14 44.2	74.14	23 14.2
4	0 2 45.26	4.053	1 45 50.2	70.22	23 8.8
5	0 1 17.02	3.295	1 18 39.9	65.53	23 3.7
6	0 0 7.35	− 2.507	+0 53 29.7	−60.23	22 58.9
7	23 59 16.80	1.703	0 30 32.6	54.45	22 54.4
8	23 58 45.64	0.894	+0 9 58.5	48.34	22 50.2
9	23 58 33.85	− 0.090	−0 8 5.9	42.00	22 46.4
10	23 58 41.22	+ 0.701	0 23 36.3	35.52	22 42.9
11	23 59 7.35	+ 1.473	−0 36 30.4	−28.99	22 39.7
12	23 59 51.74	2.222	0 46 47.9	22.48	22 36.8
13	0 0 53.80	2.944	0 54 29.9	16.04	22 34.2
14	0 2 12.84	3.637	0 59 38.5	9.71	22 31.8
15	0 3 48.16	4.300	1 2 16.7	− 3.51	22 29.7
16	0 5 39.05	+ 4.934	−1 2 28.2	+ 2.52	22 27.8
17	0 7 44.78	5.538	1 0 17.0	8.37	22 26.2
18	0 10 4.64	6.113	0 55 47.6	14.04	22 24.8
19	0 12 37.95	6.659	0 49 4.4	19.52	22 23.6
20	0 15 24.05	7.179	0 40 12.1	24.80	22 22.6
21	0 18 22.33	+ 7.674	−0 29 15.5	+29.88	22 21.8
22	0 21 32.19	8.145	0 16 19.2	34.77	22 21.2
23	0 24 53.10	8.594	−0 1 27.7	39.48	22 20.8
24	0 28 24.56	9.024	+0 15 14.6	44.01	22 20.5
25	0 32 6.11	9.436	0 33 43.3	48.36	22 20.4
26	0 35 57.35	+ 9.831	+0 53 54.1	+52.53	22 20.5
27	0 39 57.90	10.212	1 15 42.9	56.53	22 20.7
28	0 44 7.44	10.581	1 39 5.9	60.37	22 21.0
29	0 48 25.70	10.939	2 3 59.2	64.05	22 21.5
30	0 52 52.42	11.287	2 30 19.0	67.58	22 22.2
31	0 57 27.42	+11.628	+2 58 1.8	+70.96	22 22.9
32	1 2 10.53	+11.964	+3 27 4.1	+74.20	22 23.8

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.
	″	″	″	″	″	″
Semidiameter . . .	5.64	5.44	5.06	4.63	4.23	3.86
Horizontal Parallax .	14.86	14.33	13.33	12.21	11.14	10.18

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing or south declinations decreasing. The sign − indicates that north declinations are decreasing or south declinations increasing.

GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	0 57 27.42	+11.628	+ 2 58 1.8	+ 70.96	22 22.9	1	4 32 0.29	+23.277	+22 29 27.7	+73.91	. . .
2	1 2 10.53	11.964	3 27 4.1	74.20	22 23.8	2	4 41 21.31	23.465	22 57 53.2	68.14	0 0.0
3	1 7 1.64	12.295	3 57 22.5	77.30	22 24.9	3	4 50 46.13	23.594	23 23 55.4	61.99	0 5.5
4	1 12 0.65	12.623	4 28 53.5	80.26	22 26.1	4	5 0 13.32	23.661	23 47 26.0	55.52	0 11.0
5	1 17 7.52	12.950	5 1 34.0	83.08	22 27.4	5	5 9 41.38	23.666	24 8 18.3	48.81	0 16.5
6	1 22 22.25	+13.278	+ 5 35 20.6	+ 85.77	22 28.8	6	5 19 8.80	+23.609	+24 26 27.5	+41.93	0 22.1
7	1 27 44.85	13.607	6 10 9.9	88.32	22 30.3	7	5 28 34.11	23.491	24 41 50.3	34.96	0 27.6
8	1 33 15.37	13.938	6 45 58.8	90.73	22 32.0	8	5 37 55.87	23.315	24 54 25.5	27.97	0 33.0
9	1 38 53.91	14.274	7 22 43.8	92.99	22 33.8	9	5 47 12.73	23.083	25 4 13.3	21.03	0 38.4
10	1 44 40.59	14.616	8 0 21.5	95.12	22 35.8	10	5 56 23.45	22.802	25 11 15.7	14.20	0 43.6
11	1 50 35.56	+14.965	+ 8 38 48.5	+ 97.10	22 37.9	11	6 5 26.90	+22.478	+25 15 36.0	+ 7.53	0 48.7
12	1 56 38.98	15.322	9 18 1.0	98.91	22 40.2	12	6 14 22.08	22.115	25 17 18.5	+ 1.06	0 53.7
13	2 2 51.06	15.687	9 57 54.9	100.55	22 42.6	13	6 23 8.12	21.717	25 16 28.7	− 5.16	0 58.5
14	2 9 12.02	16.061	10 38 26.2	102.02	22 45.1	14	6 31 44.28	21.291	25 13 12.7	11.12	1 3.2
15	2 15 42.09	16.446	11 19 30.6	103.31	22 47.8	15	6 40 9.91	20.841	25 7 37.3	16.78	1 7.7
16	2 22 21.54	+16.842	+12 1 3.3	+104.38	22 50.7	16	6 48 24.50	+20.372	+24 59 49.7	−22.14	1 12.0
17	2 29 10.63	17.250	12 42 59.0	105.23	22 53.8	17	6 56 27.62	19.886	24 49 57.3	27.18	1 16.1
18	2 36 9.61	17.668	13 25 12.1	105.83	22 57.0	18	7 4 18.93	19.387	24 38 7.6	31.91	1 20.0
19	2 43 18.74	18.096	14 7 36.6	106.16	23 0.3	19	7 11 58.15	18.879	24 24 28.2	36.32	1 23.8
20	2 50 38.26	18.533	14 50 5.5	106.20	23 3.9	20	7 19 25.09	18.364	24 9 6.6	40.42	1 27.3
21	2 58 8.37	+18.978	+15 32 31.5	+105.92	23 7.7	21	7 26 39.58	+17.843	+23 52 10.5	−44.20	1 30.6
22	3 5 49.23	19.429	16 14 46.5	105.28	23 11.6	22	7 33 41.52	17.318	23 33 47.1	47.69	1 33.6
23	3 13 40.95	19.882	16 56 41.8	104.26	23 15.7	23	7 40 30.82	16.790	23 14 3.6	50.88	1 36.5
24	3 21 43.56	20.335	17 38 7.7	102.83	23 20.0	24	7 47 7.42	16.260	22 53 7.2	53.78	1 39.2
25	3 29 56.98	20.783	18 18 53.8	100.95	23 24.5	25	7 53 31.28	15.728	22 31 4.6	56.40	1 41.6
26	3 38 21.02	+21.220	+18 58 49.3	+ 98.60	23 29.1	26	7 59 42.35	+15.194	+22 8 2.6	−58.74	1 43.8
27	3 46 55.39	21.641	19 37 42.5	95.75	23 34.0	27	8 5 40.61	14.660	21 44 7.7	60.80	1 45.8
28	3 55 39.62	22.040	20 15 21.4	92.40	23 38.9	28	8 11 26.01	14.123	21 19 26.4	62.60	1 47.6
29	4 4 33.08	22.410	20 51 33.6	88.53	23 44.0	29	8 16 58.51	13.584	20 54 4.8	64.15	1 49.2
30	4 13 35.00	22.744	21 26 6.7	84.15	23 49.2	30	8 22 18.06	13.044	20 28 9.1	65.45	1 50.6
31	4 22 44.44	+23.035	+21 58 48.6	+ 79.27	23 54.6	31	8 27 24.59	+12.500	+20 1 45.4	−66.49	1 51.8
32	4 32 0.29	+23.277	+22 29 27.7	+ 73.91	. . .	32	8 32 18.00	+11.951	+19 34 59.6	−67.29	1 52.7

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.	Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
	″	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter .	3.54	3.27	3.03	2.83	2.68	2.58	2.53	Semidiameter . . .	2.55	2.63	2.78	2.98	3.22	3.50
Horizontal Par. .	9.34	8.61	7.99	7.47	7.07	6.79	6.66	Horizontal Parallax .	6.71	6.94	7.33	7.85	8.48	9.23

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.	Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	8 27 24.59	+12.500	+20 1 45.4	−66.49	1 51.8	1	8 58 59.67	− 7.301	+11 59 46.1	+27.30	0 20.9
2	8 32 18.00	11.951	19 34 59.6	67.29	1 52.7	2	8 56 2.46	7.446	12 11 39.3	32.06	0 14.1
3	8 36 58.18	11.397	19 7 57.6	67.84	1 53.4	3	8 53 3.27	7.464	12 25 21.4	36.36	0 7.2
4	8 41 24.99	10.837	18 40 45.4	68.14	1 53.9	4	8 50 5.25	7.350	12 40 40.7	40.14	0 0.2 23 53.5
5	8 45 38.28	10.269	18 13 29.0	68.19	1 54.2	5	8 47 11.66	7.097	12 57 23.4	43.32	23 46.8
6	8 49 37.84	+ 9.693	+17 46 14.1	−68.00	1 54.2	6	8 44 25.81	− 6.704	+13 15 14.7	+45.85	23 40.3
7	8 53 23.45	9.107	17 19 6.8	67.56	1 54.0	7	8 41 50.98	6.177	13 33 58.5	47.69	23 34.1
8	8 56 54.88	8.510	16 52 13.0	66.87	1 53.5	8	8 39 30.34	5.522	13 53 18.2	48.84	23 28.1
9	9 0 11.83	7.901	16 25 39.0	65.92	1 52.8	9	8 37 26.89	4.746	14 12 57.1	49.28	23 22.4
10	9 3 14.00	7.278	15 59 31.0	64.70	1 51.9	10	8 35 43.40	3.861	14 32 38.1	49.02	23 17.1
11	9 6 1.06	+ 6.641	+15 33 55.5	−63.21	1 50.7	11	8 34 22.34	− 2.879	+14 52 4.5	+48.07	23 12.2
12	9 8 32.65	5.988	15 8 59.0	61.45	1 49.3	12	8 33 25.86	1.814	15 11 0.2	46.46	23 7.8
13	9 10 48.37	5.319	14 44 48.0	59.41	1 47.6	13	8 32 55.78	− 0.682	15 29 9.5	44.21	23 3.8
14	9 12 47.85	4.634	14 21 29.5	57.08	1 45.6	14	8 32 53.57	+ 0.505	15 46 17.5	41.36	23 0.3
15	9 14 30.69	3.932	13 59 10.5	54.45	1 43.4	15	8 33 20.34	1.731	16 2 10.0	37.93	22 57.3
16	9 15 56.46	+ 3.213	+13 37 58.1	−51.53	1 40.9	16	8 34 16.88	+ 2.983	+16 16 33.5	+33.95	22 54.8
17	9 17 4.77	2.477	13 17 59.7	48.30	1 38.1	17	8 35 43.63	4.247	16 29 15.2	29.45	22 52.8
18	9 17 55.26	1.727	12 59 22.6	44.75	1 35.0	18	8 37 40.74	5.511	16 40 3.0	24.45	22 51.3
19	9 18 27.59	0.964	12 42 14.3	40.89	1 31.6	19	8 40 8.06	6.763	16 48 45.3	18.99	22 50.3
20	9 18 41.46	+ 0.191	12 26 42.1	36.74	1 27.8	20	8 43 5.15	7.991	16 55 11.4	13.11	22 49.8
21	9 18 36.69	− 0.589	+12 12 53.4	−32.28	1 23.7	21	8 46 31.33	+ 9.184	+16 59 11.4	+ 6.83	22 49.7
22	9 18 13.18	1.370	12 0 55.3	27.52	1 19.4	22	8 50 25.64	10.338	17 0 36.2	+ 0.19	22 50.1
23	9 17 30.95	2.147	11 50 54.4	22.50	1 14.8	23	8 54 46.89	11.428	16 59 17.7	− 6.77	22 50.9
24	9 16 30.21	2.912	11 42 56.9	17.24	1 9.9	24	8 59 33.69	12.460	16 55 9.1	13.98	22 52.1
25	9 15 11.35	3.656	11 37 8.2	11.78	1 4.6	25	9 4 44.40	13.420	16 48 5.1	21.38	22 53.7
26	9 13 34.99	− 4.368	+11 33 32.7	− 6.16	0 59.0	26	9 10 17.22	+14.301	+16 38 1.7	−28.91	22 55.6
27	9 11 42.01	5.038	11 32 13.7	− 0.42	0 53.2	27	9 16 10.18	15.097	16 24 56.9	36.49	22 57.8
28	9 9 33.59	5.653	11 33 13.0	+ 5.36	0 47.2	28	9 22 21.19	15.804	16 8 50.7	44.02	23 0.3
29	9 7 11.19	6.201	11 36 30.6	11.10	0 40.9	29	9 28 48.06	16.419	15 49 44.9	51.44	23 3.1
30	9 4 36.60	6.667	11 42 4.8	16.73	0 34.4	30	9 35 28.58	16.942	15 27 43.2	58.66	23 6.0
31	9 1 51.95	− 7.037	+11 49 51.9	+22.16	0 27.7	31	9 42 20.53	+17.372	+15 2 51.4	−65.61	23 9.1
32	8 58 59.67	− 7.301	+11 59 46.1	+27.30	0 20.9	32	9 49 21.73	+17.714	+14 35 16.9	−72.21	23 12.3

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.	Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter . . .	3.83	4.20	4.61	5.03	5.40	5.62	Semidiameter . .	5.57	5.20	4.63	4.01	3.46	3.04
Horizontal Parallax.	10.10	11.08	12.15	13.26	14.24	14.81	Horizontal Parallax	14.67	13.71	12.20	10.56	9.12	8.01

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign − indicates that north declinations are decreasing.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	9 49 21.73	+17.714	+14 35 16.9	− 72.21	23 12.3	1	13 9 41.03	+14.629	− 7 16 21.4	−108.18	0 31.3
2	9 56 30.12	17.972	14 5 8.8	78.41	23 15.6	2	13 15 31.11	14.545	7 59 21.0	106.77	0 33.2
3	10 3 43.75	18.152	13 32 37.1	84.17	23 18.9	3	13 21 19.23	14.466	8 41 46.1	105.31	0 35.0
4	10 11 0.85	18.261	12 57 52.7	89.45	23 22.3	4	13 27 5.53	14.393	9 23 35.5	103.80	0 36.9
5	10 18 19.81	18.309	12 21 7.4	94.24	23 25.7	5	13 32 50.15	14.325	10 4 47.8	102.23	0 38.7
6	10 25 39.24	+18.302	+11 42 33.0	− 98.54	23 29.1	6	13 38 33.20	+14.262	−10 45 21.8	−100.60	0 40.5
7	10 32 57.94	18.249	11 2 21.3	102.36	23 32.4	7	13 44 14.78	14.203	11 25 16.1	98.92	0 42.2
8	10 40 14.88	18.157	10 20 43.8	105.70	23 35.7	8	13 49 54.99	14.148	12 4 29.5	97.19	0 43.9
9	10 47 29.25	18.035	9 37 51.7	108.58	23 39.0	9	13 55 33.91	14.096	12 43 0.8	95.41	0 45.6
10	10 54 40.38	17.888	8 53 55.5	111.04	23 42.2	10	14 1 11.59	14.045	13 20 48.8	93.58	0 47.3
11	11 1 47.74	+17.723	+ 8 9 5.1	−113.10	23 45.3	11	14 6 48.10	+13.997	−13 57 52.1	− 91.69	0 49.0
12	11 8 50.97	17.545	7 23 29.8	114.79	23 48.3	12	14 12 23.46	13.950	14 34 9.5	89.75	0 50.7
13	11 15 49.80	17.357	6 37 18.0	116.14	23 51.3	13	14 17 57.68	13.902	15 9 39.6	87.75	0 52.3
14	11 22 44.07	17.164	5 50 37.4	117.19	23 54.2	14	14 23 30.74	13.853	15 44 21.1	85.70	0 53.9
15	11 29 33.69	16.970	5 3 35.1	117.96	23 57.0	15	14 29 2.63	13.803	16 18 12.6	83.59	0 55.5
16	11 36 18.64	+16.777	+ 4 16 17.4	−118.48	23 59.7	16	14 34 33.28	+13.750	−16 51 12.8	− 81.41	0 57.1
17	11 42 58.97	16.585	3 28 50.1	118.76	. . .	17	14 40 2.62	13.693	17 23 20.0	79.17	0 58.6
18	11 49 34.76	16.398	2 41 18.4	118.84	0 2.4	18	14 45 30.52	13.631	17 54 32.7	76.87	1 0.1
19	11 56 6.12	16.217	1 53 47.0	118.74	0 5.0	19	14 50 56.84	13.561	18 24 49.4	74.50	1 1.6
20	12 2 33.20	16.042	1 6 20.0	118.48	0 7.5	20	14 56 21.40	13.483	18 54 8.3	72.05	1 3.1
21	12 8 56.17	+15.874	+ 0 19 1.3	−118.07	0 9.9	21	15 1 43.97	+13.395	−19 22 27.5	− 69.53	1 4.5
22	12 15 15.21	15.714	− 0 28 5.8	117.51	0 12.3	22	15 7 4.28	13.295	19 49 45.2	66.93	1 5.9
23	12 21 30.50	15.562	1 14 58.3	116.84	0 14.6	23	15 12 22.01	13.180	20 15 59.5	64.25	1 7.2
24	12 27 42.24	15.418	2 1 33.3	116.06	0 16.9	24	15 17 36.78	13.047	20 41 8.2	61.47	1 8.5
25	12 33 50.62	15.282	2 47 48.3	115.18	0 19.1	25	15 22 48.14	12.895	21 5 9.1	58.60	1 9.8
26	12 39 55.84	+15.155	− 3 33 41.0	−114.20	0 21.2	26	15 27 55.57	+12.720	−21 27 59.9	− 55.62	1 11.0
27	12 45 58.09	15.035	4 19 9.3	113.14	0 23.3	27	15 32 58.48	12.518	21 49 38.0	52.54	1 12.1
28	12 51 57.55	14.923	5 4 11.2	112.01	0 25.4	28	15 37 56.17	12.285	22 10 0.8	49.34	1 13.1
29	12 57 54.41	14.818	5 48 45.0	110.80	0 27.4	29	15 42 47.84	12.016	22 29 5.3	46.02	1 14.0
30	13 3 48.85	14.720	6 32 48.9	109.52	0 29.4	30	15 47 32.58	11.706	22 46 48.6	42.57	1 14.8
31	13 9 41.03	+14.629	− 7 16 21.4	−108.18	0 31.3	31	15 52 9.35	+11.351	−23 3 7.4	− 38.97	1 15.5
32	13 15 31.11	+14.545	− 7 59 21.0	−106.77	0 33.2	32	15 56 36.98	+10.943	−23 17 58.0	− 35.22	1 16.0

Day of the Month.	3d.	8th.	13th.	18th.	23d.	28th.	Day of the Month.	3d.	8th.	13th.	18th.	23d.	28th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter . . .	2.74	2.56	2.45	2.40	2.38	2.39	Semidiameter . . .	2.42	2.48	2.56	2.68	2.83	3.03
Horizontal Parallax .	7.23	6.75	6.46	6.32	6.27	6.30	Horizontal Parallax .	6.39	6.54	6.75	7.05	7.45	7.98

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	15 56 36.98	+10.943	−23 17 58.0	−35.22	1 16.0	1	15 24 12.04	− 1.960	−16 0 29.6	+20.12	22 41.1
2	16 0 54.12	10.475	23 31 16.6	31.30	1 16.3	2	15 23 46.39	− 0.194	15 54 44.4	+ 8.79	22 37.4
3	16 4 59.26	9.942	23 42 59.1	27.20	1 16.4	3	15 24 1.92	+ 1.467	15 53 21.4	− 1.71	22 34.3
4	16 8 50.71	9.333	23 53 0.9	22.90	1 16.3	4	15 24 55.87	3.007	15 55 58.7	11.22	22 31.8
5	16 12 26.57	8.641	24 1 16.9	18.38	1 16.0	5	15 26 25.20	4.415	16 2 11.4	19.65	22 29.9
6	16 15 44 73	+ 7.856	−24 7 41.4	−13.62	1 15.3	6	15 28 26.74	+ 5.691	−16 11 33.4	−27.01	22 28.4
7	16 18 42.86	6.970	24 12 8.4	8.59	1 14.3	7	15 30 57.37	6.840	16 23 39.0	33.29	22 27.4
8	16 21 18.42	5.974	24 14 31.0	− 3.25	1 13.0	8	15 33 54.13	7.870	16 38 3.3	38.57	22 26.8
9	16 23 28.67	4.860	24 14 41.5	+ 2.43	1 11.2	9	15 37 14.27	8.790	16 54 23.0	42.92	22 26.5
10	16 25 10.69	3.621	24 12 31.4	8.47	1 8.9	10	15 40 55.26	9.610	17 12 16.9	46.43	22 26.5
11	16 26 21.47	+ 2.256	−24 7 51.5	+14.92	1 6.1	11	15 44 54.84	+10.341	−17 31 25.6	−49.17	22 26.8
12	16 26 58.00	+ 0.767	24 0 31.8	21.79	1 2.8	12	15 49 11.00	10.993	17 51 31.6	51.22	22 27.4
13	16 26 57.38	− 0.837	23 50 22.1	29.10	0 58.8	13	15 53 41.93	11.574	18 12 19.3	52.64	22 28.2
14	16 26 17.05	2.539	23 37 11.8	36.83	0 54.2	14	15 58 26.05	12.093	18 33 35.1	53.53	22 29.2
15	16 24 54.99	4.308	23 20 51.3	44.93	0 48.9	15	16 3 21.98	12.559	18 55 6.7	53.97	22 30.3
16	16 22 50.08	− 6.101	−23 1 13.1	+53.28	0 42.8	16	16 8 28.50	+12.977	−19 16 43.2	−53.99	22 31.6
17	16 20 2.42	7.859	22 38 13.3	61.69	0 36.1	17	16 13 44.57	13.355	19 38 15.4	53.63	22 33.1
18	16 16 33.70	9.510	22 11 53.9	69.87	0 28.7	18	16 19 9.26	13.697	19 59 34.7	52.93	22 34.7
19	16 12 27.43	10.973	21 42 24.9	77.42	0 20.7	19	16 24 41.76	14.007	20 20 33.8	51.94	22 36.4
20	16 7 49.14	12.164	21 10 6.8	83.87	0 12.2	20	16 30 21.37	14.290	20 41 6.1	50.70	22 38.2
21	16 2 46.37	−13.002	−20 35 32.1	+88.71	0 8.2 23 54.0	21	16 36 7.47	+14.549	−21 1 5.8	−49.23	22 40.2
22	15 57 28.37	13.425	19 59 25.7	91.44	23 44.8	22	16 41 59.52	14.786	21 20 27.7	47.56	22 42.2
23	15 52 5.56	13.399	19 22 43.0	91.68	23 35.6	23	16 47 57.04	15.005	21 39 7.3	45.71	22 44.3
24	15 46 48.82	12.922	18 46 26.8	89.21	23 26.7	24	16 53 59.62	15.207	21 57 0.5	43.70	22 46.4
25	15 41 48.66	12.025	18 11 42.1	84.06	23 18.2	25	17 0 6.88	15.395	22 14 3.6	41.54	22 48.7
26	15 37 14.49	−10.768	−17 39 30.9	+76.49	23 10.3	26	17 6 18.50	+15.570	−22 30 13.2	−39.25	22 51.0
27	15 33 14.00	9.233	17 10 46.4	66.93	23 3.0	27	17 12 34.17	15.734	22 45 26.4	36.84	22 53.4
28	15 29 52.85	7.505	16 46 9.6	55.94	22 56.4	28	17 18 53.63	15.887	22 59 40.4	34.32	22 55.8
29	15 27 14.65	5.669	16 26 7.9	44.12	22 50.6	29	17 25 16.64	16.030	23 12 52.8	31.70	22 58.3
30	15 25 21.04	3.800	16 10 54.3	32.02	22 45.5	30	17 31 42.99	16.164	23 25 1.2	28.99	23 0.9
31	15 24 12.04	− 1.960	−16 0 29.6	+20.12	22 41.1	31	17 38 12.48	+16.291	−23 36 3.5	−26.19	23 3.5
32	15 23 46.39	− 0.194	−15 54 44.4	+ 8.79	22 37.4	32	17 44 44.91	+16.410	−23 45 57.8	−23.32	23 6.1

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	32d.
	″	″	″	″	″	″		″	″	″	″	″	″	″
Semidiameter . . .	3.30	3.67	4.14	4.65	4.93	4.69	Semidiameter .	4.14	3.60	3.20	2.91	2.71	2.57	2.47
Horizontal Parallax .	8.70	9.67	10.92	12.27	12.99	12.35	Horizontal Par.	10.89	9.48	8.43	7.68	7.15	6.78	6.51

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; the sign − indicates that south declinations are increasing.

GREENWICH MEAN TIME.

JANUARY.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	21 44 55.68	+11.371	−15 24 21.2	+63.52	3 2.9
2	21 49 27.77	11.303	14 58 45.7	64.43	3 3.4
3	21 53 58.24	11.236	14 32 48.6	65.31	3 4.0
4	21 58 27.09	11.169	14 6 30.8	66.16	3 4.6
5	22 2 54.34	11.102	13 39 53.0	66.97	3 5.1
6	22 7 20.00	+11.036	−13 12 56.1	+67.75	3 5.6
7	22 11 44.07	10.970	12 45 40.8	68.50	3 6.0
8	22 16 6.58	10.905	12 18 7.9	69.21	3 6.4
9	22 20 27.53	10.840	11 50 18.4	69.89	3 6.8
10	22 24 46.93	10.776	11 22 13.0	70.54	3 7.2
11	22 29 4.80	+10.713	−10 53 52.4	+71.16	3 7.6
12	22 33 21.15	10.650	10 25 17.5	71.74	3 7.9
13	22 37 35.98	10.587	9 56 29.1	72.28	3 8.2
14	22 41 49.31	10.525	9 27 28.1	72.79	3 8.5
15	22 46 1.16	10.463	8 58 15.2	73.27	3 8.7
16	22 50 11.53	+10.402	− 8 28 51.3	+73.71	3 9.0
17	22 54 20.44	10.341	7 59 17.1	74.12	3 9.2
18	22 58 27.90	10.281	7 29 33.4	74.50	3 9.4
19	23 2 33.92	10.221	6 59 40.9	74.85	3 9.5
20	23 6 38.52	10.162	6 29 40.5	75.17	3 9.6
21	23 10 41.72	+10.104	− 5 59 33.0	+75.45	3 9.7
22	23 14 43.53	10.047	5 29 19.1	75.70	3 9.8
23	23 18 43.96	9.990	4 58 59.6	75.92	3 9.9
24	23 22 43.03	9.933	4 28 35.1	76.11	3 10.0
25	23 26 40.75	9.877	3 58 6.3	76.27	3 10.0
26	23 30 37.14	+ 9.822	− 3 27 34.0	+76.40	3 10.0
27	23 34 32.22	9.767	2 56 58.9	76.50	3 9.9
28	23 38 25.99	9.713	2 26 21.7	76.58	3 9.9
29	23 42 18.47	9.660	1 55 43.0	76.63	3 9.8
30	23 46 9.68	9.607	1 25 3.4	76.65	3 9.7
31	23 49 59.61	+ 9.554	− 0 54 23.8	+76.63	3 9.6
32	23 53 48.26	+ 9.501	− 0 23 44.9	+76.59	3 9.5

Day of Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
	″	″	″	″	″	″	″
Semidiameter .	8.56	8.86	9.19	9.55	9.95	10.39	10.87
Horizontal Par.	8.81	9.12	9.46	9.83	10.24	10.70	11.19

FEBRUARY.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	23 53 48.26	+9.501	− 0 23 44.9	+76.59	3 9.5
2	23 57 35.65	9.448	+ 0 6 52.6	76.52	3 9.3
3	0 1 21.76	9.395	0 37 28.1	76.42	3 9.1
4	0 5 6.60	9.342	1 8 0.8	76.29	3 8.9
5	0 8 50.16	9.288	1 38 30.0	76.13	3 8.7
6	0 12 32.43	+9.234	+ 2 8 55.0	+75.94	3 8.5
7	0 16 13.41	9.180	2 39 15.1	75.72	3 8.2
8	0 19 53.07	9.125	3 9 29.5	75.47	3 7.9
9	0 23 31.40	9.069	3 39 37.4	75.18	3 7.6
10	0 27 8.38	9.012	4 9 38.2	74.87	3 7.3
11	0 30 43.99	+8.954	+ 4 39 31.2	+74.52	3 6.9
12	0 34 18.19	8.895	5 9 15.6	74.15	3 6.5
13	0 37 50.96	8.835	5 38 50.6	73.75	3 6.1
14	0 41 22.27	8.773	6 8 15.5	73.31	3 5.7
15	0 44 52.08	8.710	6 37 29.6	72.85	3 5.3
16	0 48 20.35	+8.645	+ 7 6 32.1	+72.35	3 4.8
17	0 51 47.04	8.578	7 35 22.3	71.82	3 4.3
18	0 55 12.10	8.509	8 3 59.5	71.27	3 3.8
19	0 58 35.47	8.437	8 32 23.0	70.68	3 3.3
20	1 1 57.11	8.364	9 0 32.1	70.07	3 2.7
21	1 5 16.96	+8.289	+ 9 28 26.1	+69.42	3 2.1
22	1 8 34.97	8.211	9 56 4.3	68.75	3 1.4
23	1 11 51.08	8.130	10 23 26.1	68.05	3 0.7
24	1 15 5.22	8.047	10 50 30.8	67.33	3 0.0
25	1 18 17.33	7.961	11 17 17.7	66.58	2 59.2
26	1 21 27.33	+7.871	+11 43 46.1	+65.80	2 58.4
27	1 24 35.14	7.778	12 9 55.4	64.98	2 57.6
28	1 27 40.67	7.681	12 35 44.9	64.14	2 56.8
29	1 30 43.83	7.580	13 1 13.9	63.28	2 55.9
30	1 33 44.52	7.475	13 26 21.6	62.38	2 54.9
31	1 36 42.62	+7.365	+13 51 7.4	+61.44	2 53.9
32	1 39 38.03	+7.250	+14 15 30.4	+60.48	2 52.9

Day of the Month.	5th.	10th.	15th.	20th.	25th.
	″	″	″	″	″
Semidiameter . . .	11.40	12.00	12.66	13.41	14.25
Horizontal Parallax .	11.74	12.36	13.04	13.81	14.67

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	1 30 43.83	+7.580	+13 1 13.9	+63.28	2 55.9	1	2 30 58.96	+0.684	+21 55 53.4	+14.29	1 53.7
2	1 33 44.52	7.475	13 26 21.6	62.38	2 54.9	2	2 31 10.92	+0.312	22 1 4.3	11.61	1 49.9
3	1 36 42.62	7.365	13 51 7.4	61.44	2 53.9	3	2 31 13.88	−0.066	22 5 9.9	8.84	1 46.0
4	1 39 38.03	7.250	14 15 30.4	60.48	2 52.9	4	2 31 7.70	0.449	22 8 7.6	5.96	1 42.0
5	1 42 30.61	7.130	14 39 29.8	59.48	2 51.8	5	2 30 52.28	0.836	22 9 55.0	+ 2.98	1 37.8
6	1 45 20.24	+7.004	+15 3 4.9	+58.45	2 50.7	6	2 30 27.55	−1.225	+22 10 29.8	− 0.10	1 33.5
7	1 48 6.77	6.872	15 26 14.8	57.38	2 49.5	7	2 29 53.50	1.613	22 9 49.4	3.27	1 29.0
8	1 50 50.04	6.733	15 48 58.6	56.28	2 48.3	8	2 29 10.16	1.999	22 7 51.7	6.54	1 24.3
9	1 53 29.89	6.587	16 11 15.5	55.14	2 47.0	9	2 28 17.60	2.381	22 4 34.5	9.90	1 19.5
10	1 56 6.16	6.434	16 33 4.6	53.96	2 45.7	10	2 27 15.95	2.755	21 59 55.9	13.33	1 14.5
11	1 58 38.68	+6.274	+16 54 25.0	+52.74	2 44.3	11	2 26 5.43	−3.119	+21 53 54.3	−16.82	1 9.4
12	2 1 7.26	6.106	17 15 15.6	51.48	2 42.8	12	2 24 46.32	3.471	21 46 28.3	20.36	1 4.2
13	2 3 31.69	5.929	17 35 35.3	50.17	2 41.3	13	2 23 18.96	3.807	21 37 36.9	23.92	0 58.8
14	2 5 51.76	5.743	17 55 23.2	48.82	2 39.7	14	2 21 43.76	4.123	21 27 19.8	27.49	0 53.3
15	2 8 7.27	5.548	18 14 38.1	47.42	2 38.0	15	2 20 1.24	4.416	21 15 37.2	31.05	0 47.7
16	2 10 18.00	+5.344	+18 33 19.0	+45.98	2 36.2	16	2 18 11.99	−4.684	+21 2 29.9	−34.55	0 41.9
17	2 12 23.71	5.130	18 51 24.5	44.48	2 34.3	17	2 16 16.66	4.923	20 47 59.4	37.97	0 36.1
18	2 14 24.16	4.906	19 8 53.5	42.93	2 32.4	18	2 14 15.97	5.130	20 32 7.9	41.29	0 30.2
19	2 16 19.10	4.672	19 25 44.6	41.33	2 30.4	19	2 12 10.72	5.308	20 14 58.4	44.47	0 24.2
20	2 18 8.29	4.427	19 41 56.6	39.67	2 28.3	20	2 10 1.77	5.437	19 56 35.0	47.46	0 18.1
21	2 19 51.48	+4.172	+19 57 28.1	+37.95	2 26.1	21	2 7 50.02	−5.535	+19 37 2.4	−50.23	0 12.0
22	2 21 28.42	3.906	20 12 17.5	36.16	2 23.7	22	2 5 36.40	5.594	19 16 26.0	52.76	0 5.9 23 59.7
23	2 22 58.85	3.629	20 26 23.3	34.31	2 21.2	23	2 3 21.87	5.612	18 54 52.0	55.02	23 53.5
24	2 24 22.52	3.342	20 39 44.1	32.40	2 18.7	24	2 1 7 38	5.590	18 32 27.3	56.98	23 47.4
25	2 25 39.19	3.045	20 52 18.2	30.42	2 16.0	25	1 58 53.89	5.528	18 9 19.3	58.62	23 41.3
26	2 26 48.60	+2.737	+21 4 3.9	+28.37	2 13.2	26	1 56 42.33	−5.429	+17 45 35.9	−59.93	23 35.2
27	2 27 50.50	2.419	21 14 59.4	26.23	2 10.3	27	1 54 33.60	5.293	17 21 25.3	60.89	23 29.2
28	2 28 44.64	2.091	21 25 2.7	24.02	2 7.3	28	1 52 28.55	5.122	16 56 55.8	61.51	23 23.3
29	2 29 30.78	1.753	21 34 11.9	21.73	2 4.1	29	1 50 27.99	4.920	16 32 15.7	61.78	23 17.5
30	2 30 8.69	1.405	21 42 24.9	19.35	2 0.8	30	1 48 32.65	4.688	16 7 33.4	61.69	23 11.8
31	2 30 38.15	+1.049	+21 49 39.5	+16.87	1 57.3	31	1 46 43.22	−4.429	+15 42 57.3	−61.26	23 6.1
32	2 30 58.96	+0.684	+21 55 53.4	+14.29	1 53.7	32	1 45 0.30	−4.145	+15 18 35.3	−60.52	23 0.5

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter . . .	15.19	16.25	17.45	18.80	20.31	21.98	Semidiameter. . .	23.77	25.62	27.36	28.82	29.74	29.90
Horizontal Parallax	15.64	16.73	17.97	19.36	20.92	22.64	Horizontal Parallax	24.48	26.38	28.18	29.68	30.62	30.79

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign − indicates that north declinations are decreasing.

VENUS, 1913.

GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	1 46 43.22	−4.429	+15 42 57.3	−61.26	23 6.1	1	1 56 6.64	+5.289	+10 5 38.4	+10.29	21 17.1
2	1 45 0.30	4.145	15 18 35.3	60.52	23 0.5	2	1 58 16.05	5.494	10 10 7.1	12.08	21 15.4
3	1 43 24.44	3.840	14 54 34.9	59.47	22 55.1	3	2 0 30.30	5.692	10 15 17.6	13.78	21 13.8
4	1 41 56.10	3.518	14 31 3.1	58.13	22 49.8	4	2 2 49.21	5.883	10 21 8.0	15.40	21 12.2
5	1 40 35.68	3.181	14 8 6.4	56.54	22 44.7	5	2 5 12.62	6.067	10 27 36.4	16.94	21 10.7
6	1 39 23.48	−2.833	+13 45 51.0	−54.71	22 39.7	6	2 7 40.37	+6.245	+10 34 40.8	+18.40	21 9.3
7	1 38 19.76	2.475	13 24 22.2	52.66	22 34.8	7	2 10 12.31	6.416	10 42 19.2	19.78	21 8.0
8	1 37 24.71	2.110	13 3 44.7	50.44	22 30.1	8	2 12 48.29	6.582	10 50 29.9	21.09	21 6.7
9	1 36 38.47	1.742	12 44 2.4	48.06	22 25.6	9	2 15 28.19	6.742	10 59 11.3	22.33	21 5.4
10	1 36 1.10	1.372	12 25 19.0	45.54	22 21.2	10	2 18 11.87	6.897	11 8 21.5	23.50	21 4.2
11	1 35 32.63	−1.001	+12 7 37.4	−42.92	22 17.0	11	2 20 59.21	+7.048	+11 17 58.9	+24.60	21 3.1
12	1 35 13.05	0.632	11 50 59.8	40.21	22 12.9	12	2 23 50.11	7.194	11 28 1.8	25.63	21 2.1
13	1 35 2.31	−0.265	11 35 28.0	37.43	22 8.9	13	2 26 44.48	7.336	11 38 28.7	26.60	21 1.1
14	1 35 0.33	+0.098	11 21 3.6	34.60	22 5.0	14	2 29 42.21	7.474	11 49 18.0	27.50	21 0.2
15	1 35 7.01	0.456	11 7 47.4	31.75	22 1.3	15	2 32 43.21	7.609	12 0 28.3	28.34	20 59.3
16	1 35 22.22	+0.809	+10 55 39.9	−28.89	21 57.7	16	2 35 47.41	+7.741	+12 11 58.0	+29.12	20 58.5
17	1 35 45.80	1.154	10 44 41.1	26.03	21 54.3	17	2 38 54.73	7.869	12 23 45.7	29.84	20 57.7
18	1 36 17.58	1.492	10 34 50.8	23.18	21 51.0	18	2 42 5.08	7.993	12 35 49.9	30.50	20 57.0
19	1 36 57.37	1.823	10 26 8.6	20.35	21 47.9	19	2 45 18.39	8.115	12 48 9.1	31.10	20 56.3
20	1 37 44.98	2.145	10 18 33.7	17.57	21 44.9	20	2 48 34.60	8.234	13 0 42.0	31.64	20 55.7
21	1 38 40.20	+2.457	+10 12 4.8	−14.85	21 42.0	21	2 51 53.63	+8.350	+13 13 27.2	+32.12	20 55.1
22	1 39 42.82	2.760	10 6 40.5	12.19	21 39.2	22	2 55 15.42	8.464	13 26 23.4	32.55	20 54.6
23	1 40 52.61	3.054	10 2 19.4	9.58	21 36.6	23	2 58 39.92	8.575	13 39 29.2	32.92	20 54.1
24	1 42 9.34	3.339	9 59 0.1	7.04	21 34.1	24	3 2 7.05	8.684	13 52 43.2	33.24	20 53.6
25	1 43 32.80	3.615	9 56 40.7	4.58	21 31.6	25	3 5 36.77	8.791	14 6 4.1	33.50	20 53.2
26	1 45 2.76	+3.881	+ 9 55 19.3	− 2.21	21 29.2	26	3 9 9.01	+8.895	+14 19 30.7	+33.71	20 52.8
27	1 46 38.99	4.137	9 54 54.0	+ 0.08	21 27.0	27	3 12 43.73	8.997	14 33 1.8	33.87	20 52.5
28	1 48 21.26	4.385	9 55 22.9	2.29	21 24.8	28	3 16 20.87	9.097	14 46 36.2	33.98	20 52.2
29	1 50 9.37	4.624	9 56 43.8	4.42	21 22.7	29	3 20 0.39	9.195	15 0 12.5	34.04	20 51.9
30	1 52 3.10	4.854	9 58 54.7	6.46	21 20.7	30	3 23 42.24	9.291	15 13 49.5	34.04	20 51.7
31	1 54 2.26	+5.075	+10 1 53.6	+ 8.42	21 18.9	31	3 27 26.36	+9.385	+15 27 26.1	+34.00	20 51.5
32	1 56 6.64	+5.289	+10 5 38.4	+10.29	21 17.1	32	3 31 12.71	+9.477	+15 41 1.2	+33.92	20 51.4

Day of Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
	″	″	″	″	″	″	″
Semidiameter .	29.29	28.02	26.34	24.46	22.59	20.82	19.20
Horizontal Par.	30.16	28.85	27.12	25.19	23.26	21.44	19.77

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
	″	″	″	″	″	″
Semidiameter . . .	17.74	16.46	15.32	14.31	13.41	12.63
Horizontal Parallax	18.27	16.95	15.77	14.73	13.81	13.00

Note.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	3 27 26.36	+ 9.385	+15 27 26.1	+34.00	20 51.5	1	5 38 58.78	+11.623	+20 57 8.5	+13.55	21 1.6
2	3 31 12.71	9.477	15 41 1.2	33.92	20 51.4	2	5 43 38.32	11.671	21 2 20.0	12.39	21 2.4
3	3 35 1.26	9.567	15 54 33.8	33.79	20 51.3	3	5 48 18.99	11.717	21 7 3.4	11.21	21 3.2
4	3 38 51.95	9.656	16 8 2.7	33.61	20 51.2	4	5 53 0.74	11.761	21 11 18.1	10.01	21 3.9
5	3 42 44.75	9.743	16 21 26.8	33.39	20 51.2	5	5 57 43.52	11.803	21 15 3.7	8.78	21 4.7
6	3 46 39.62	+ 9.828	+16 34 45.0	+33.13	20 51.2	6	6 2 27.30	+11.843	+21 18 19.8	+ 7.54	21 5.5
7	3 50 36.52	9.913	16 47 56.4	32.83	20 51.2	7	6 7 12.02	11.882	21 21 5.9	6.28	21 6.3
8	3 54 35.43	9.996	17 1 0.0	32.48	20 51.3	8	6 11 57.65	11.919	21 23 21.5	5.01	21 7.1
9	3 58 36.32	10.077	17 13 54.8	32.09	20 51.4	9	6 16 44.14	11.954	21 25 6.2	3.72	21 7.9
10	4 2 39.15	10.157	17 26 40.0	31.67	20 51.5	10	6 21 31.44	11.987	21 26 19.8	2.41	21 8.8
11	4 6 43.90	+10.237	+17 39 14.5	+31.21	20 51.7	11	6 26 19.51	+12.018	+21 27 1.9	+ 1.09	21 9.7
12	4 10 50.54	10.316	17 51 37.4	30.71	20 51.9	12	6 31 8.31	12.047	21 27 12.1	− 0.25	21 10.6
13	4 14 59.05	10.393	18 3 47.9	30.17	20 52.1	13	6 35 57.78	12.075	21 26 50.0	1.60	21 11.5
14	4 19 9.41	10.470	18 15 45.1	29.59	20 52.4	14	6 40 47.90	12.101	21 25 55.4	2.96	21 12.4
15	4 23 21.59	10.545	18 27 28.0	28.98	20 52.7	15	6 45 38.61	12.124	21 24 28.1	4.32	21 13.3
16	4 27 35.57	+10.619	+18 38 55.8	+28.34	20 53.0	16	6 50 29.86	+12.146	+21 22 27.8	− 5.70	21 14.2
17	4 31 51.32	10.693	18 50 7.7	27.66	20 53.3	17	6 55 21.61	12.166	21 19 54.3	7.09	21 15.1
18	4 36 8.82	10.765	19 1 2.8	26.94	20 53.7	18	7 0 13.81	12.183	21 16 47.4	8.49	21 16.1
19	4 40 28.03	10.836	19 11 40.3	26.18	20 54.1	19	7 5 6.41	12.199	21 13 6.9	9.89	21 17.1
20	4 44 48.93	10.905	19 21 59.3	25.40	20 54.5	20	7 9 59.36	12.212	21 8 52.7	11.30	21 18.0
21	4 49 11.49	+10.974	+19 31 59.0	+24.58	20 55.0	21	7 14 52.61	+12.224	+21 4 4.6	−12.71	21 18.9
22	4 53 35.67	11.041	19 41 38.6	23.73	20 55.5	22	7 19 46.13	12.234	20 58 42.7	14.12	21 19.9
23	4 58 1.44	11.106	19 50 57.4	22.84	20 56.0	23	7 24 39.86	12.242	20 52 46.8	15.53	21 20.9
24	5 2 28.77	11.170	19 59 54.6	21.93	20 56.5	24	7 29 33.75	12.248	20 46 17.0	16.95	21 21.8
25	5 6 57.62	11.233	20 8 29.4	20.98	20 57.1	25	7 34 27.76	12.252	20 39 13.2	18.37	21 22.7
26	5 11 27.95	+11.294	+20 16 41.1	+20.00	20 57.7	26	7 39 21.83	+12.253	+20 31 35.4	−19.78	21 23.7
27	5 15 59.73	11.353	20 24 29.0	19.00	20 58.3	27	7 44 15.92	12.253	20 23 23.7	21.19	21 24.7
28	5 20 32.91	11.411	20 31 52.5	17.96	20 58.9	28	7 49 9.99	12.251	20 14 38.3	22.59	21 25.6
29	5 25 7.45	11.466	20 38 50.8	16.89	20 59.5	29	7 54 3.98	12.247	20 5 19.3	23.99	21 26.6
30	5 29 43.30	11.520	20 45 23.3	15.80	21 0.2	30	7 58 57.85	12.241	19 55 26.8	25.38	21 27.6
31	5 34 20.43	+11.573	+20 51 29.4	+14.69	21 0.9	31	8 3 51.56	+12.234	+19 45 0.9	−26.77	21 28.5
32	5 38 58.78	+11.623	+20 57 8.5	+13.55	21 1.6	32	8 8 45.07	+12.225	+19 34 1.9	−28.14	21 29.4

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.	Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter . . .	11.92	11.29	10.72	10.22	9.76	9.35	Semidiameter . . .	8.98	8.64	8.33	8.05	7.79	7.55
Horizontal Parallax .	12.27	11.62	11.04	10.52	10.05	9.63	Horizontal Parallax.	9.25	8.90	8.58	8.29	8.02	7.78

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign − indicates that north declinations are decreasing.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	8 8 45.07	+12.225	+19 34 1.9	−28.14	21 29.4	1	10 32 0.31	+11.598	+10 17 19.5	−61.63	21 54.2
2	8 13 38.34	12.214	19 22 30.1	29.50	21 30.3	2	10 36 38.40	11.577	9 52 31.0	62.39	21 54.9
3	8 18 31.34	12.201	19 10 25.7	30.86	21 31.3	3	10 41 15.99	11.556	9 27 24.7	63.12	21 55.5
4	8 23 24.01	12.187	18 57 48.9	32.20	21 32.3	4	10 45 53.10	11.536	9 2 1.2	63.82	21 56.2
5	8 28 16.33	12.172	18 44 40.1	33.52	21 33.2	5	10 50 29.74	11.517	8 36 21.1	64.50	21 56.9
6	8 33 8.27	+12.156	+18 30 59.6	−34.84	21 34.1	6	10 55 5.93	+11.499	+ 8 10 25.1	−65.15	21 57.6
7	8 37 59.82	12.139	18 16 47.6	36.15	21 35.0	7	10 59 41.71	11.482	7 44 13.9	65.77	21 58.2
8	8 42 50.94	12.121	18 2 4.6	37.44	21 35.9	8	11 4 17.09	11.466	7 17 48.1	66.36	21 58.8
9	8 47 41.63	12.102	17 46 50.8	38.71	21 36.8	9	11 8 52.10	11.452	6 51 8.4	66.93	21 59.4
10	8 52 31.84	12.082	17 31 6.6	39.97	21 37.7	10	11 13 26.77	11.438	6 24 15.4	67.48	22 0.0
11	8 57 21.57	+12.061	+17 14 52.4	−41.21	21 38.6	11	11 18 1.12	+11.425	+ 5 57 9.7	−67.99	22 0.7
12	9 2 10.80	12.040	16 58 8.7	42.43	21 39.5	12	11 22 35.18	11.414	5 29 52.1	68.47	22 1.3
13	9 6 59.51	12.018	16 40 55.8	43.63	21 40.3	13	11 27 8.99	11.404	5 2 23.4	68.92	22 1.9
14	9 11 47.69	11.996	16 23 14.2	44.82	21 41.1	14	11 31 42.58	11.395	4 34 44.0	69.35	22 2.5
15	9 16 35.32	11.973	16 5 4.3	45.99	21 41.9	15	11 36 15.97	11.388	4 6 54.6	69.75	22 3.2
16	9 21 22.40	+11.950	+15 46 26.5	−47.14	21 42.7	16	11 40 49.20	+11.382	+ 3 38 56.0	−70.12	22 3.8
17	9 26 8.93	11.927	15 27 21.4	48.27	21 43.6	17	11 45 22.30	11.377	3 10 49.0	70.46	22 4.4
18	9 30 54.89	11.903	15 7 49.4	49.38	21 44.4	18	11 49 55.30	11.374	2 42 34.1	70.77	22 5.0
19	9 35 40.28	11.879	14 47 51.1	50.47	21 45.2	19	11 54 28.24	11.372	2 14 12.1	71.05	22 5.6
20	9 40 25.09	11.855	14 27 26.9	51.54	21 46.0	20	11 59 1.15	11.371	1 45 43.6	71.31	22 6.2
21	9 45 9.32	+11.831	+14 6 37.5	−52.58	21 46.8	21	12 3 34.07	+11.372	+ 1 17 9.3	−71.53	22 6.8
22	9 49 52.98	11.807	13 45 23.3	53.60	21 47.6	22	12 8 7.03	11.375	0 48 30.1	71.72	22 7.4
23	9 54 36.06	11.783	13 23 44.9	54.59	21 48.4	23	12 12 40.06	11.379	+ 0 19 46.7	71.88	22 8.0
24	9 59 18.56	11.759	13 1 42.9	55.56	21 49.2	24	12 17 13.20	11.384	− 0 9 0.2	72.02	22 8.6
25	10 4 0.49	11.735	12 39 17.9	56.51	21 49.9	25	12 21 46.48	11.390	0 37 50.0	72.12	22 9.2
26	10 8 41.85	+11.711	+12 16 30.4	−57.43	21 50.6	26	12 26 19.94	+11.398	− 1 6 41.8	−72.19	22 9.8
27	10 13 22.65	11.688	11 53 21.2	58.32	21 51.3	27	12 30 53.60	11.407	1 35 34.9	72.22	22 10.5
28	10 18 2.88	11.665	11 29 50.9	59.19	21 52.0	28	12 35 27.50	11.418	2 4 28.5	72.22	22 11.2
29	10 22 42.56	11.642	11 6 0.1	60.03	21 52.8	29	12 40 1.67	11.430	2 33 21.9	72.20	22 11.8
30	10 27 21.70	11.620	10 41 49.4	60.84	21 53.5	30	12 44 36.15	11.444	3 2 14.2	72.14	22 12.4
31	10 32 0.31	+11.598	+10 17 19.5	−61.63	21 54.2	31	12 49 10.98	+11.459	− 3 31 4.8	−72.05	22 13.0
32	10 36 38.40	+11.577	+ 9 52 31.0	−62.39	21 54.9	32	12 53 46.18	+11.475	− 3 59 52.8	−71.93	22 13.7

Day of the Month.	3d.	8th.	13th.	18th.	23d.	28th.	Day of the Month.	3d.	8th.	13th.	18th.	23d.	28th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter . . .	7.33	7.13	6.95	6.78	6.62	6.48	Semidiameter . . .	6.34	6.21	6.10	5.99	5.89	5.80
Horizontal Parallax	7.55	7.34	7.15	6.98	6.82	6.67	Horizontal Parallax	6.53	6.40	6.28	6.17	6.07	5.97

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.	Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	12 53 46.18	+11.475	− 3 59 52.8	−71.93	22 13.7	1	15 17 6.03	+12.584	−17 0 42.9	−53.26	22 39.2
2	12 58 21.80	11.494	4 28 37.5	71.78	22 14.4	2	15 22 8.63	12.633	17 21 47.5	52.12	22 40.3
3	13 2 57.86	11.513	4 57 18.2	71.60	22 15.1	3	15 27 12.42	12.682	17 42 24.4	50.94	22 41.4
4	13 7 34.41	11.534	5 25 54.1	71.38	22 15.7	4	15 32 17.39	12.731	18 2 32.8	49.74	22 42.6
5	13 12 11.47	11.556	5 54 24.4	71.13	22 16.4	5	15 37 23.55	12.781	18 22 11.9	48.51	22 43.8
6	13 16 49.10	+11.580	− 6 22 48.3	−70.85	22 17.1	6	15 42 30.90	+12.831	−18 41 21.1	−47.25	22 45.0
7	13 21 27.32	11.605	6 51 5.1	70.54	22 17.8	7	15 47 39.43	12.880	18 59 59.6	45.96	22 46.2
8	13 26 6.16	11.632	7 19 14.2	70.20	22 18.5	8	15 52 49.13	12.928	19 18 6.7	44.63	22 47.5
9	13 30 45.66	11.660	7 47 14.7	69.83	22 19.2	9	15 57 59.99	12.976	19 35 41.6	43.27	22 48.8
10	13 35 25.87	11.690	8 15 5.8	69.42	22 19.9	10	16 3 11.99	13.024	19 52 43.7	41.89	22 50.0
11	13 40 6.82	+11.722	− 8 42 46.7	−68.98	22 20.7	11	16 8 25.13	+13.071	−20 9 12.2	−40.48	22 51.3
12	13 44 48.53	11.755	9 10 16.7	68.50	22 21.5	12	16 13 39.39	13.117	20 25 6.5	39.04	22 52.6
13	13 49 31.05	11.789	9 37 35.0	68.00	22 22.3	13	16 18 54.75	13.162	20 40 26.0	37.57	22 53.9
14	13 54 14.40	11.824	10 4 40.9	67.47	22 23.1	14	16 24 11.19	13.207	20 55 9.9	36.08	22 55.3
15	13 58 58.62	11.861	10 31 33.5	66.90	22 23.9	15	16 29 28.68	13.250	21 9 17.6	34.56	22 56.7
16	14 3 43.75	+11.900	−10 58 12.1	−66.30	22 24.7	16	16 34 47.19	+13.292	−21 22 48.5	−33.01	22 58.1
17	14 8 29.81	11.939	11 24 36.0	65.67	22 25.5	17	16 40 6.70	13.333	21 35 42.0	31.44	22 59.5
18	14 13 16.84	11.980	11 50 44.3	65.00	22 26.4	18	16 45 27.18	13.373	21 47 57.5	29.85	23 0.9
19	14 18 4.85	12.022	12 16 36.1	64.30	22 27.3	19	16 50 48.59	13.411	21 59 34.5	28.23	23 2.3
20	14 22 53.89	12.065	12 42 10.7	63.57	22 28.2	20	16 56 10.89	13.447	22 10 32.4	26.59	23 3.7
21	14 27 43.97	+12.109	−13 7 27.4	−62.80	22 29.1	21	17 1 34.03	+13.481	−22 20 50.8	−24.93	23 5.2
22	14 32 35.11	12.154	13 32 25.2	62.00	22 30.0	22	17 6 57.98	13.514	22 30 29.1	23.25	23 6.7
23	14 37 27.33	12.199	13 57 3.3	61.16	22 30.9	23	17 12 22.69	13.544	22 39 26.8	21.55	23 8.2
24	14 42 20.66	12.245	14 21 21.0	60.29	22 31.9	24	17 17 48.10	13.572	22 47 43.5	19.83	23 9.6
25	14 47 15.11	12.292	14 45 17.4	59.39	22 32.9	25	17 23 14.16	13.599	22 55 18.7	18.10	23 11.1
26	14 52 10.69	+12.340	−15 8 51.6	−58.45	22 33.9	26	17 28 40.83	+13.623	−23 2 12.1	−16.35	23 12.6
27	14 57 7.42	12.388	15 32 2.9	57.48	22 34.9	27	17 34 8.04	13.644	23 8 23.4	14.59	23 14.1
28	15 2 5.32	12.436	15 54 50.5	56.47	22 35.9	28	17 39 35.73	13.663	23 13 52.3	12.81	23 15.7
29	15 7 4.38	12.485	16 17 13.6	55.43	22 37.0	29	17 45 3.84	13.679	23 18 38.4	11.03	23 17.2
30	15 12 4.62	12.534	16 39 11.3	54.36	22 38.1	30	17 50 32.31	13.693	23 22 41.6	9.23	23 18.7
31	15 17 6.03	+12.584	−17 0 42.9	−53.26	22 39.2	31	17 56 1.08	+13.704	−23 26 1.6	− 7.43	23 20.2
32	15 22 8.63	+12.633	−17 21 47.5	−52.12	22 40.3	32	18 1 30.10	+13.712	−23 28 38.2	− 5.62	23 21.8

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of Month.	2d.	7th.	12th.	17th.	22d.	27th.	32d.
	″	″	″	″	″	″		″	″	″	″	″	″	″
Semidiameter . . .	5.72	5.64	5.57	5.50	5.44	5.38	Semidiameter .	5.33	5.28	5.24	5.20	5.17	5.13	5.10
Horizontal Parallax .	5.89	5.81	5.73	5.66	5.60	5.54	Horizontal Par.	5.49	5.44	5.39	5.35	5.32	5.28	5.25

The sign − prefixed to the hourly change of declination indicates that south declinations are increasing.

MARS, 1913.

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	17 30 41.05	+8.024	−23 44 4.6	− 7.14	22 47.9	1	19 11 41.78	+8.178	−23 12 8.9	+12.43	22 26.7
2	17 33 53.79	8.038	23 46 49.1	6.55	22 47.1	2	19 14 58.01	8.174	23 7 3.0	13.06	22 26.0
3	17 37 6.86	8.051	23 49 19.0	5.94	22 46.4	3	19 18 14.14	8.169	23 1 42.0	13.69	22 25.4
4	17 40 20.23	8.063	23 51 34.2	5.33	22 45.7	4	19 21 30.15	8.164	22 56 6.0	14.31	22 24.7
5	17 43 33.89	8.075	23 53 34.6	4.71	22 45.0	5	19 24 46.02	8.158	22 50 15.0	14.93	22 24.0
6	17 46 47.83	+8.086	−23 55 20.1	− 4.09	22 44.3	6	19 28 1.75	+8.152	−22 44 9.1	+15.55	22 23.3
7	17 50 2.04	8.097	23 56 50.8	3.47	22 43.6	7	19 31 17.32	8.145	22 37 48.4	16.16	22 22.6
8	17 53 16.49	8.107	23 58 6.6	2.84	22 42.9	8	19 34 32.71	8.138	22 31 13.0	16.77	22 22.0
9	17 56 31.17	8.117	23 59 7.3	2.21	22 42.2	9	19 37 47.91	8.130	22 24 23.0	17.38	22 21.3
10	17 59 46.08	8.126	23 59 52.8	1.58	22 41.5	10	19 41 2.91	8.121	22 17 18.5	17.99	22 20.6
11	18 3 1.19	+8.134	−24 0 23.1	− 0.95	22 40.8	11	19 44 17.70	+8.112	−22 9 59.5	+18.59	22 19.9
12	18 6 16.50	8.141	24 0 38.4	− 0.32	22 40.1	12	19 47 32.27	8.102	22 2 26.1	19.19	22 19.2
13	18 9 31.98	8.148	24 0 38.5	+ 0.31	22 39.5	13	19 50 46.61	8.092	21 54 38.5	19.78	22 18.5
14	18 12 47.62	8.155	24 0 23 3	0.95	22 38.8	14	19 54 0.70	8.082	21 46 36.8	20.37	22 17.8
15	18 16 3.41	8.161	23 59 52.9	1.59	22 38.1	15	19 57 14.54	8.071	21 38 21.0	20.95	22 17.0
16	18 19 19.33	+8.166	−23 59 7.2	+ 2.22	22 37.4	16	20 0 28.12	+8.060	−21 29 51.3	+21.53	22 16.3
17	18 22 35.36	8.171	23 58 6.1	2.86	22 36.7	17	20 3 41.43	8.049	21 21 7.8	22.10	22 15.6
18	18 25 51.50	8.175	23 56 49.7	3.50	22 36.1	18	20 6 54.47	8.038	21 12 10.6	22.67	22 14.8
19	18 29 7.74	8.178	23 55 17.9	4.14	22 35.4	19	20 10 7.23	8.026	21 2 59.8	23.23	22 14.1
20	18 32 24.06	8.181	23 53 30.8	4.78	22 34.7	20	20 13 19.70	8.014	20 53 35.5	23.79	22 13.4
21	18 35 40.45	+8.183	−23 51 28.3	+ 5.42	22 34.1	21	20 16 31.88	+8.002	−20 43 57.7	+24.35	22 12.6
22	18 38 56.89	8.185	23 49 10.5	6.06	22 33.4	22	20 19 43.76	7.989	20 34 6.6	24.90	22 11.9
23	18 42 13.38	8.187	23 46 37.3	6.70	22 32.7	23	20 22 55.34	7.976	20 24 2.4	25.44	22 11.2
24	18 45 29.91	8.189	23 43 48.8	7.34	22 32.1	24	20 26 6.62	7.963	20 13 45.2	25.98	22 10.4
25	18 48 46.46	8.190	23 40 44.9	7.98	22 31.4	25	20 29 17.58	7.950	20 3 15.1	26.52	22 9.6
26	18 52 3.02	+8.190	−23 37 25.7	+ 8.62	22 30.7	26	20 32 28.22	+7.937	−19 52 32.3	+27.05	22 8.8
27	18 55 19.57	8.189	23 33 51.1	9.26	22 30.1	27	20 35 38.53	7.923	19 41 36.9	27.57	22 8.0
28	18 58 36.11	8.188	23 30 1.2	9.90	22 29.4	28	20 38 48.50	7.909	19 30 29.0	28.08	22 7.3
29	19 1 52.62	8.187	23 25 56.0	10.54	22 28.7	29	20 41 58.13	7.895	19 19 8.8	28.59	22 6.5
30	19 5 9.08	8.184	23 21 35.5	11.17	22 28.1	30	20 45 7.42	7.880	19 7 36.4	29.10	22 5.7
31	19 8 25.47	+8.181	−23 16 59.8	+11.80	22 27.4	31	20 48 16.36	+7.865	−18 55 51.9	+29.60	22 4.9
32	19 11 41.78	+8.178	−23 12 8.9	+12.43	22 26.7	32	20 51 24.94	+7.850	−18 43 55.5	+30.09	22 4.1

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
	″	″	″	″	″	″	″
Semidiameter. .	2.10	2.12	2.14	2.16	2.17	2.19	2.21
Horizontal Par. .	3.66	3.69	3.72	3.75	3.78	3.82	3.85

Day of the Month.	5th.	10th.	15th.	20th.	25th.
	″	″	″	″	″
Semidiameter	2.23	2.25	2.28	2.30	2.32
Horizontal Parallax . . .	3.89	3.93	3.97	4.01	4.05

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	20 41 58.13	+7.895	−19 19 8.8	+28.59	22 6.5	1	22 16 50.45	+7.411	−12 1 12.2	+40.86	21 38.9
2	20 45 7.42	7.880	19 7 36.4	29.10	22 5.7	2	22 19 48.14	7.397	11 44 48.2	41.13	21 38.0
3	20 48 16.36	7.865	18 55 51.9	29.60	22 4.9	3	22 22 45.49	7.382	11 28 17.8	41.39	21 37 0
4	20 51 24.94	7.850	18 43 55.5	30.09	22 4.1	4	22 25 42.49	7.368	11 11 41.2	41.64	21 36.0
5	20 54 33.15	7.834	18 31 47.5	30.57	22 3.3	5	22 28 39.15	7.354	10 54 58.5	41.89	21 35.0
6	20 57 40.99	+7.819	−18 19 28.0	+31.04	22 2.5	6	22 31 35.47	+7.340	−10 38 10.0	+42.13	21 34.0
7	21 0 48.45	7.803	18 6 57.1	31.51	22 1.6	7	22 34 31.46	7.326	10 21 15.8	42.37	21 33.0
8	21 3 55.54	7.787	17 54 15.1	31.98	22 0.8	8	22 37 27.12	7.312	10 4 16.2	42.59	21 32.0
9	21 7 2.26	7.771	17 41 22.1	32.44	22 0.0	9	22 40 22.45	7.299	9 47 11.3	42.80	21 30.9
10	21 10 8.59	7.755	17 28 18.3	32.89	21 59.1	10	22 43 17.45	7.285	9 30 1.4	43.01	21 29.9
11	21 13 14.52	+7.739	−17 15 3.8	+33.33	21 58.3	11	22 46 12.14	+7.272	− 9 12 46.7	+43.21	21 28.9
12	21 16 20.06	7.723	17 1 38.8	33.76	21 57.4	12	22 49 6.51	7.259	8 55 27.3	43.40	21 27.8
13	21 19 25.21	7.707	16 48 3.6	34.18	21 56.6	13	22 52 0.57	7.246	8 38 3.5	43.58	21 26.8
14	21 22 29.97	7.690	16 34 18.3	34.60	21 55.7	14	22 54 54.33	7.234	8 20 35.5	43.75	21 25.7
15	21 25 34.34	7.674	16 20 23.0	35.01	21 54.8	15	22 57 47.79	7.222	8 3 3.4	43.91	21 24.7
16	21 28 38.31	+7.658	−16 6 18.0	+35.41	21 54.0	16	23 0 40.97	+7.210	− 7 45 27.4	+44.07	21 23.6
17	21 31 41.89	7.641	15 52 3.4	35.81	21 53.1	17	23 3 33.87	7.199	7 27 47.7	44.23	21 22.6
18	21 34 45.08	7.625	15 37 39.4	36.20	21 52.2	18	23 6 26.50	7.188	7 10 4.4	44.37	21 21.5
19	21 37 47.88	7.609	15 23 6.1	36.58	21 51.3	19	23 9 18.87	7.177	6 52 17.8	44.50	21 20.4
20	21 40 50.29	7.593	15 8 23.8	36.96	21 50.4	20	23 12 10.98	7.166	6 34 28.0	44.63	21 19.4
21	21 43 52.32	+7.577	−14 53 32.6	+37.33	21 49.5	21	23 15 2.84	+7.156	− 6 16 35.2	+44.75	21 18.3
22	21 46 53.97	7.561	14 38 32.6	37.68	21 48.5	22	23 17 54.47	7.146	5 58 39.5	44.87	21 17.2
23	21 49 55.25	7.546	14 23 24.0	38.03	21 47.6	23	23 20 45.86	7.137	5 40 41.2	44.98	21 16.1
24	21 52 56.16	7.530	14 8 7.1	38.37	21 46.7	24	23 23 37.03	7.128	5 22 40.4	45.08	21 15.0
25	21 55 56.71	7.515	13 52 42.0	38.71	21 45.7	25	23 26 27.99	7.119	5 4 37.3	45.17	21 13.9
26	21 58 56.89	+7.500	−13 37 8.9	+39.04	21 44.8	26	23 29 18.74	+7.110	− 4 46 32.1	+45.25	21 12.8
27	22 1 56.71	7.485	13 21 28.0	39.37	21 43.8	27	23 32 9.28	7.101	4 28 25.0	45.33	21 11.7
28	22 4 56.17	7.470	13 5 39.4	39.68	21 42.9	28	23 34 59.62	7.093	4 10 16.2	45.40	21 10.6
29	22 7 55.27	7.455	12 49 43.3	39.99	21 41.9	29	23 37 49.76	7.085	3 52 5.9	45.46	21 9.5
30	22 10 54.02	7.440	12 33 39.9	40.29	21 40.9	30	23 40 39.70	7.077	3 33 54.3	45.51	21 8.4
31	22 13 52.41	+7.426	−12 17 29.5	+40.58	21 39.9	31	23 43 29.46	+7.069	− 3 15 41.7	+45.55	21 7.2
32	22 16 50.45	+7.411	−12 1 12.2	+40.86	21 38.9	32	23 46 19.05	+7.062	− 2 57 28.2	+45.59	21 6.1

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter . . .	2.35	2.37	2.40	2.42	2.45	2.48	Semidiameter . . .	2.50	2.53	2.56	2.59	2.62	2.65
Horizontal Parallax .	4.09	4.13	4.18	4.22	4.27	4.32	Horizontal Parallax .	4.36	4.41	4.46	4.51	4.56	4.61

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	23 43 29.46	+7.069	−3 15 41.7	+45.55	21 7.2	1	1 10 12.20	+6.958	+ 6 1 3.9	+43.10	20 31.8
2	23 46 19.05	7.062	2 57 28.2	45.59	21 6.1	2	1 12 59.19	6.958	6 18 16.2	42.92	20 30.6
3	23 49 8.46	7.055	2 39 14.0	45.61	21 5.0	3	1 15 46.17	6.958	6 35 23.8	42.72	20 29.4
4	23 51 57.71	7.048	2 20 59.2	45.62	21 3.9	4	1 18 33.16	6.958	6 52 26.5	42.51	20 28.3
5	23 54 46.79	7.041	2 2 44.1	45.63	21 2.8	5	1 21 20.15	6.958	7 9 24.1	42.29	20 27.1
6	23 57 35.70	+7.035	−1 44 28.9	+45.63	21 1.6	6	1 24 7.14	+6.958	+ 7 26 16.5	+42.07	20 26.0
7	0 0 24.46	7.029	1 26 13.8	45.62	21 0.5	7	1 26 54.14	6.958	7 43 3.5	41.84	20 24.8
8	0 3 13.07	7.023	1 7 59.0	45.61	20 59.4	8	1 29 41.15	6.958	7 59 45.0	41.60	20 23.7
9	0 6 1.53	7.017	0 49 44.7	45.58	20 58.3	9	1 32 28.16	6.959	8 16 20.7	41.36	20 22.5
10	0 8 49.85	7.011	0 31 31.0	45.55	20 57.1	10	1 35 15.19	6.960	8 32 50.6	41.11	20 21.4
11	0 11 38.04	+7.006	−0 13 18.1	+45.52	20 56.0	11	1 38 2.23	+6.961	+ 8 49 14.5	+40.86	20 20.2
12	0 14 26.10	7.001	+0 4 53.7	45.47	20 54.8	12	1 40 49.29	6.962	9 5 32.3	40.61	20 19.1
13	0 17 14.05	6.996	0 23 4.3	45.41	20 53.7	13	1 43 36.39	6.963	9 21 43.9	40.35	20 17.9
14	0 20 1.89	6.991	0 41 13.5	45.35	20 52.5	14	1 46 23.52	6.964	9 37 49.1	40.08	20 16.7
15	0 22 49.62	6.987	0 59 21.2	45.28	20 51.4	15	1 49 10.68	6.966	9 53 47.8	39.81	20 15.6
16	0 25 37.25	+6.983	+1 17 27.2	+45.21	20 50.2	16	1 51 57.88	+6.968	+10 9 39.9	+39.53	20 14.4
17	0 28 24.79	6.979	1 35 31.4	45.13	20 49.1	17	1 54 45.13	6.970	10 25 25.3	39.25	20 13.3
18	0 31 12.26	6.976	1 53 33.6	45.05	20 47.9	18	1 57 32.42	6.972	10 41 3.9	38.96	20 12.1
19	0 33 59.66	6.973	2 11 33.7	44.96	20 46.8	19	2 0 19.76	6.974	10 56 35.5	38.66	20 11.0
20	0 36 47.00	6.971	2 29 31.5	44.86	20 45.6	20	2 3 7.15	6.976	11 11 59.9	38.36	20 9.8
21	0 39 34.28	+6.969	+2 47 26.9	+44.75	20 44.5	21	2 5 54.60	+6.978	+11 27 17.0	+38.06	20 8.6
22	0 42 21.51	6.967	3 5 19.6	44.64	20 43.3	22	2 8 42.11	6.980	11 42 26.7	37.75	20 7.5
23	0 45 8.70	6.965	3 23 9.5	44.52	20 42.2	23	2 11 29.67	6.983	11 57 28.9	37.43	20 6.3
24	0 47 55.85	6.964	3 40 56.4	44.39	20 41.0	24	2 14 17.28	6.985	12 12 23.5	37.11	20 5.2
25	0 50 42.96	6.962	3 58 40.2	44.26	20 39.9	25	2 17 4.94	6.987	12 27 10.3	36.78	20 4.0
26	0 53 30.04	+6.961	+4 16 20.7	+44.12	20 38.7	26	2 19 52.66	+6.989	+12 41 49.2	+36.45	20 2.9
27	0 56 17.10	6.960	4 33 57.7	43.97	20 37.6	27	2 22 40.44	6.991	12 56 20.0	36.11	20 1.8
28	0 59 4.15	6.960	4 51 31.0	43.81	20 36.4	28	2 25 28.26	6.993	13 10 42.6	35.76	20 0.6
29	1 1 51.17	6.959	5 9 0.4	43.64	20 35.2	29	2 28 16.12	6.995	13 24 56.8	35.41	19 59.5
30	1 4 38.19	6.959	5 26 25.8	43.47	20 34.1	30	2 31 4.02	6.997	13 39 2.6	35.06	19 58.3
31	1 7 25.20	+6.959	+5 43 47.0	+43.29	20 32.9	31	2 33 51.96	+6.998	+13 52 59.8	+34.70	19 57.2
32	1 10 12.20	+6.958	+6 1 3.9	+43.10	20 31.8	32	2 36 39.94	+6.999	+14 6 48.3	+34.34	19 56.0

Day of Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
	″	″	″	″	″	″	″
Semidiameter .	2.68	2.71	2.74	2.77	2.80	2.84	2.87
Horizontal Par.	4.66	4.72	4.77	4.83	4.88	4.94	5.00

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
	″	″	″	″	″	″
Semidiameter . . .	2.91	2.94	2.98	3.02	3.06	3.10
Horizontal Parallax	5.06	5.13	5.19	5.26	5.33	5.40

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

JULY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	2 33 51.96	+6.998	+13 52 59.8	+34.70	19 57.2
2	2 36 39.94	6.999	14 6 48.3	34.34	19 56.0
3	2 39 27.95	7.000	14 20 28.0	33.97	19 54.9
4	2 42 15.97	7.001	14 33 58.8	33.59	19 53.7
5	2 45 4.01	7.002	14 47 20.5	33.21	19 52.6
6	2 47 52.07	+7.002	+15 0 33.0	+32.83	19 51.4
7	2 50 40.14	7.003	15 13 36.3	32.44	19 50.3
8	2 53 28.21	7.003	15 26 30.2	32.05	19 49.2
9	2 56 16.28	7.003	15 39 14.6	31.65	19 48.0
10	2 59 4.35	7.003	15 51 49.5	31.25	19 46.9
11	3 1 52.42	+7.003	+16 4 14.8	+30.85	19 45.7
12	3 4 40.49	7.002	16 16 30.5	30.45	19 44.6
13	3 7 28.55	7.002	16 28 36.5	30.04	19 43.5
14	3 10 16.60	7.002	16 40 32.7	29.63	19 42.3
15	3 13 4.64	7.001	16 52 19.0	29.22	19 41.2
16	3 15 52.67	+7.001	+17 3 55.3	+28.81	19 40.0
17	3 18 40.68	7.000	17 15 21.7	28.39	19 38.9
18	3 21 28.67	6.999	17 26 38.1	27.97	19 37.8
19	3 24 16.63	6.998	17 37 44.3	27.55	19 36.6
20	3 27 4.56	6.997	17 48 40.3	27.12	19 35.5
21	3 29 52.45	+6.995	+17 59 26.1	+26.69	19 34.3
22	3 32 40.29	6.993	18 10 1.6	26.26	19 33.2
23	3 35 28.08	6.990	18 20 26.7	25.83	19 32.0
24	3 38 15.80	6.987	18 30 41.3	25.39	19 30.9
25	3 41 3.44	6.983	18 40 45.4	24.95	19 29.8
26	3 43 50.99	+6.979	+18 50 39.0	+24.51	19 28.6
27	3 46 38.45	6.975	19 0 21.9	24.07	19 27.5
28	3 49 25.81	6.971	19 9 54.1	23.62	19 26.3
29	3 52 13.05	6.966	19 19 15.6	23.17	19 25.1
30	3 55 0.16	6.960	19 28 26.4	22.72	19 24.0
31	3 57 47.12	+6.954	+19 37 26.4	+22.27	19 22.8
32	4 0 33.92	+6.947	+19 46 15.6	+21.82	19 21.7

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
	″	″	″	″	″	″
Semidiameter	3.15	3.19	3.24	3.29	3.34	3.40
Horizontal Parallax .	5.48	5.56	5.64	5.73	5.82	5.92

AUGUST.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	4 0 33.92	+6.947	+19 46 15.6	+21.82	19 21.7
2	4 3 20.55	6.939	19 54 53.9	21.37	19 20.5
3	4 6 6.99	6.931	20 3 21.3	20.92	19 19.4
4	4 8 53.23	6.922	20 11 37.9	20.47	19 18.2
5	4 11 39.27	6.913	20 19 43.7	20.01	19 17.0
6	4 14 25.09	+6.904	+20 27 38.6	+19.56	19 15.8
7	4 17 10.68	6.894	20 35 22.6	19.11	19 14.6
8	4 19 56.02	6.884	20 42 55.7	18.66	19 13.4
9	4 22 41.11	6.873	20 50 18.0	18.21	19 12.2
10	4 25 25.94	6.862	20 57 29.5	17.76	19 11.0
11	4 28 10.50	+6.851	+21 4 30.2	+17.31	19 9.8
12	4 30 54.78	6.839	21 11 20.1	16.86	19 8.6
13	4 33 38.77	6.827	21 17 59.3	16.41	19 7.4
14	4 36 22.46	6.814	21 24 27.8	15.96	19 6.2
15	4 39 5.84	6.801	21 30 45.7	15.52	19 5.0
16	4 41 48.90	+6.787	+21 36 53.0	+15.08	19 3.8
17	4 44 31.62	6.773	21 42 49.7	14.64	19 2.5
18	4 47 13.99	6.758	21 48 35.8	14.20	19 1.3
19	4 49 56.00	6.742	21 54 11.3	13.76	19 0.0
20	4 52 37.63	6.726	21 59 36.3	13.32	18 58.8
21	4 55 18.86	+6.709	+22 4 50.9	+12.89	18 57.5
22	4 57 59.68	6.692	22 9 55.1	12.46	18 56.2
23	5 0 40.08	6.674	22 14 49.0	12.03	18 55.0
24	5 3 20.04	6.655	22 19 32.6	11.60	18 53.7
25	5 5 59.53	6.635	22 24 6.0	11.18	18 52.4
26	5 8 38.53	+6.614	+22 28 29.2	+10.76	18 51.1
27	5 11 17.03	6.593	22 32 42.4	10.34	18 49.8
28	5 13 55.00	6.571	22 36 45.5	9.92	18 48.5
29	5 16 32.43	6.548	22 40 38.7	9.51	18 47.1
30	5 19 9.29	6.524	22 44 22.1	9.11	18 45.8
31	5 21 45.57	+6.499	+22 47 55.8	+ 8.70	18 44.5
32	5 24 21.25	+6.473	+22 51 19.8	+ 8.30	18 43.1

Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
	″	″	″	″	″	″
Semidiameter	3.46	3.52	3.59	3.66	3.74	3.82
Horizontal Parallax .	6.03	6.14	6.26	6.39	6.52	6.66

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

MARS, 1913.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	5 24 21.25	+6.473	+22 51 19.8	+8.30	18 43.1	1	6 36 3.79	+5.347	+23 30 14.7	−0.77	17 56.3
2	5 26 56.30	6.447	22 54 34.3	7.91	18 41.8	2	6 38 11.50	5.294	23 29 54.1	0.95	17 54.5
3	5 29 30.70	6.420	22 57 39.5	7.52	18 40.4	3	6 40 17.94	5.240	23 29 29.4	1.12	17 52.6
4	5 32 4.45	6.392	23 0 35.4	7.14	18 39.0	4	6 42 23.08	5.186	23 29 0.8	1.28	17 50.7
5	5 34 37.53	6.364	23 3 22.1	6.76	18 37.6	5	6 44 26.90	5.131	23 28 28.5	1.42	17 48.8
6	5 37 9.92	+6.335	+23 5 59.9	+6.39	18 36.2	6	6 46 29.38	+5.075	+23 27 52.8	−1.55	17 46.9
7	5 39 41.60	6.305	23 8 28.8	6.02	18 34.8	7	6 48 30.48	5.018	23 27 13.8	1.67	17 45.0
8	5 42 12.56	6.275	23 10 49.0	5.66	18 33.3	8	6 50 30.19	4.960	23 26 31.9	1.79	17 43.0
9	5 44 42.79	6.244	23 13 0.6	5.30	18 31.9	9	6 52 28.50	4.900	23 25 47.4	1.90	17 41.0
10	5 47 12.27	6.212	23 15 3.7	4.95	18 30.4	10	6 54 25.38	4.840	23 25 0.4	2.00	17 39.0
11	5 49 40.99	+6.180	+23 16 58.5	+4.61	18 28.9	11	6 56 20.80	+4.778	+23 24 11.3	−2.08	17 37.0
12	5 52 8.93	6.147	23 18 45.1	4.28	18 27.5	12	6 58 14.72	4.715	23 23 20.3	2.15	17 34.9
13	5 54 36.07	6.113	23 20 23.7	3.95	18 26.0	13	7 0 7.12	4.651	23 22 27.5	2.22	17 32.8
14	5 57 2.38	6.079	23 21 54.4	3.62	18 24.5	14	7 1 57.97	4.586	23 21 33.3	2.28	17 30.7
15	5 59 27.86	6.044	23 23 17.3	3.30	18 23.0	15	7 3 47.25	4.520	23 20 38.0	2.32	17 28.6
16	6 1 52.49	+6.008	+23 24 32.6	+2.99	18 21.4	16	7 5 34.93	+4.452	+23 19 41.8	−2.35	17 26.4
17	6 4 16.25	5.971	23 25 40.5	2.68	18 19.9	17	7 7 20.97	4.383	23 18 45.0	2.37	17 24.2
18	6 6 39.11	5.933	23 26 41.2	2.38	18 18.3	18	7 9 5.33	4.313	23 17 47.9	2.38	17 22.0
19	6 9 1.05	5.894	23 27 34.9	2.09	18 16.7	19	7 10 47.98	4.241	23 16 50.8	2.37	17 19.7
20	6 11 22.05	5.854	23 28 21.7	1.81	18 15.1	20	7 12 28.89	4.168	23 15 54.0	2.36	17 17.5
21	6 13 42.09	+5.814	+23 29 1.7	+1.54	18 13.4	21	7 14 8.01	+4.092	+23 14 57.7	−2.33	17 15.2
22	6 16 1.15	5.773	23 29 35.1	1.27	18 11.8	22	7 15 45.30	4.015	23 14 2.3	2.29	17 12.9
23	6 18 19.20	5.730	23 30 2.2	1.01	18 10.1	23	7 17 20.72	3.936	23 13 8.1	2.23	17 10.5
24	6 20 36.20	5.686	23 30 23.1	0.75	18 8.5	24	7 18 54.23	3.856	23 12 15.3	2.16	17 8.1
25	6 22 52.13	5.641	23 30 38.0	0.51	18 6.8	25	7 20 25.79	3.773	23 11 24.3	2.08	17 5.6
26	6 25 6.96	+5.595	+23 30 47.1	+0.28	18 5.1	26	7 21 55.35	+3.689	+23 10 35.4	−1.98	17 3.1
27	6 27 20.68	5.548	23 30 50.8	+0.04	18 3.4	27	7 23 22.86	3.603	23 9 49.0	1.87	17 0.6
28	6 29 33.25	5.500	23 30 49.2	−0.18	18 1.6	28	7 24 48.28	3.515	23 9 5.4	1.75	16 58.1
29	6 31 44.64	5.450	23 30 42.5	0.38	17 59.9	29	7 26 11.58	3.426	23 8 24.9	1.62	16 55.5
30	6 33 54.83	5.399	23 30 30.9	0.58	17 58.1	30	7 27 32.70	3.334	23 7 47.8	1.47	16 52.9
31	6 36 3.79	+5.347	+23 30 14.7	−0.77	17 56.3	31	7 28 51.61	+3.241	+23 7 14.4	−1.31	16 50.3
32	6 38 11.50	+5.294	+23 29 54.1	−0.95	17 54.5	32	7 30 8.28	+3.147	+23 6 45.1	−1.13	16 47.6

Day of the Month.	3d.	8th.	13th.	18th.	23d.	28th.	Day of the Month.	3d.	8th.	13th.	18th.	23d.	28th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter . . .	3.91	4.00	4.10	4.21	4.33	4.45	Semidiameter . . .	4.59	4.74	4.89	5.06	5.24	5.44
Horizontal Parallax	6.81	6.97	7.15	7.34	7.54	7.76	Horizontal Parallax	8.00	8.25	8.52	8.82	9.14	9.48

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	7 30 8.28	+3.147	+23 6 45.1	−1.13	16 47.6
2	7 31 22.65	3.051	23 6 20.1	0.94	16 44.9
3	7 32 34.69	2.953	23 5 59.7	0.74	16 42.1
4	7 33 44.37	2.853	23 5 44.3	0.53	16 39.3
5	7 34 51.64	2.752	23 5 34.1	−0.31	16 36.5
6	7 35 56.45	+2.649	+23 5 29.4	−0.07	16 33.6
7	7 36 58.77	2.544	23 5 30.5	+0.17	16 30.7
8	7 37 58.55	2.437	23 5 37.7	0.43	16 27.7
9	7 38 55.75	2.328	23 5 51.3	0.70	16 24.7
10	7 39 50.32	2.218	23 6 11.5	0.98	16 21.6
11	7 40 42.21	+2.106	+23 6 38.6	+1.28	16 18.5
12	7 41 31.38	1.991	23 7 12.8	1.58	16 15.3
13	7 42 17.78	1.874	23 7 54.4	1.89	16 12.1
14	7 43 1.34	1.755	23 8 43.6	2.22	16 8.9
15	7 43 42.01	1.634	23 9 40.7	2.55	16 5.6
16	7 44 19.76	+1.511	+23 10 46.0	+2.89	16 2.2
17	7 44 54.52	1.385	23 11 59.7	3.25	15 58.8
18	7 45 26.23	1.256	23 13 22.0	3.61	15 55.4
19	7 45 54.82	1.126	23 14 53.2	3.99	15 51.9
20	7 46 20.25	0.993	23 16 33.5	4.37	15 48.4
21	7 46 42.47	+0.858	+23 18 23.0	+4.76	15 44.8
22	7 47 1.41	0.720	23 20 22.0	5.16	15 41.1
23	7 47 17.01	0.580	23 22 30.5	5.56	15 37.4
24	7 47 29.24	0.438	23 24 48.8	5.97	15 33.7
25	7 47 38 03	0.294	23 27 17.0	6.38	15 29.9
26	7 47 43.35	+0.148	+23 29 55.0	+6.79	15 26.0
27	7 47 45.16	+0.001	23 32 42.9	7.20	15 22.0
28	7 47 43.41	−0.147	23 35 40.7	7.61	15 18.0
29	7 47 38.08	0.297	23 38 48.3	8.02	15 14.0
30	7 47 29.14	0.448	23 42 5.8	8.43	15 9.9
31	7 47 16.57	−0.600	+23 45 32.9	+8.83	15 5.7
32	7 47 0.35	−0.752	+23 49 9.6	+9.22	15 1.4

DECEMBER.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	7 47 16.57	−0.600	+23 45 32.9	+ 8.83	15 5.7
2	7 47 0.35	0.752	23 49 9.6	9.22	15 1.4
3	7 46 40.46	0.905	23 52 55.7	9.61	14 57.1
4	7 46 16.88	1.059	23 56 50.9	9.99	14 52.8
5	7 45 49.62	1.212	24 0 55.0	10.35	14 48.4
6	7 45 18.68	−1.366	+24 5 7.6	+10.70	14 43.9
7	7 44 44.06	1.519	24 9 28.5	11.04	14 39.3
8	7 44 5.76	1.672	24 13 57.3	11.36	14 34.7
9	7 43 23.80	1.824	24 18 33.7	11.67	14 30.0
10	7 42 38.20	1.976	24 23 17.2	11.95	14 25.3
11	7 41 48.98	−2.126	+24 28 7.2	+12.22	14 20.5
12	7 40 56.18	2.274	24 33 3.4	12.46	14 15.7
13	7 39 59.83	2.421	24 38 5.1	12.68	14 10.8
14	7 38 59.98	2.566	24 43 11.8	12.88	14 5.9
15	7 37 56.68	2.708	24 48 23.0	13.05	14 0.9
16	7 36 49.99	−2.848	+24 53 38.0	+13.19	13 55.8
17	7 35 39.98	2.985	24 58 56.1	13.31	13 50.7
18	7 34 26.72	3.119	25 4 16.6	13.39	13 45.5
19	7 33 10.30	3.249	25 9 38.9	13.45	13 40.3
20	7 31 50.83	3.373	25 15 2.2	13.48	13 35.0
21	7 30 28.42	−3.493	+25 20 25.7	+13.47	13 29.7
22	7 29 3.18	3.608	25 25 48.5	13.43	13 24.3
23	7 27 35.26	3.717	25 31 10.0	13.36	13 18.9
24	7 26 4.82	3.819	25 36 29.4	13.25	13 13.4
25	7 24 32.02	3.914	25 41 45.7	13.10	13 7.9
26	7 22 57.02	−4.001	+25 46 58.2	+12.93	13 2.4
27	7 21 20.02	4.081	25 52 6.0	12.72	12 56.9
28	7 19 41.21	4.152	25 57 8.3	12.47	12 51.3
29	7 18 0.79	4.214	26 2 4.4	12.19	12 45.7
30	7 16 18.98	4.268	26 6 53.4	11.89	12 40.1
31	7 14 36.00	−4.313	+26 11 34.7	+11.55	12 34.4
32	7 12 52.05	−4.348	+26 16 7.7	+11.19	12 28.7

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.
	″	″	″	″	″	″
Semidiameter . . .	5.65	5.87	6.11	6.36	6.62	6.88
Horizontal Parallax .	9.85	10.23	10.65	11.09	11.53	11.99

Day of Month.	2d.	7th.	12th.	17th.	22d.	27th.	32d.
	″	″	″	″	″	″	″
Semidiameter .	7.14	7.39	7.63	7.83	7.98	8.08	8.11
Horizontal Par.	12.45	12.88	13.29	13.64	13.91	14.08	14.14

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign — indicates that north declinations are decreasing.

GREENWICH MEAN TIME.

JANUARY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	17 58 41.59	+2.472	−23 13 31.7	−0.29	23 13.7
2	17 59 40.88	2.469	23 13 37.9	0.23	23 10.8
3	18 0 40.10	2.466	23 13 42.8	0.17	23 7.8
4	18 1 39.23	2.462	23 13 46.3	0.11	23 4.8
5	18 2 38.27	2.458	23 13 48.4	−0.06	23 1.9
6	18 3 37.22	+2.454	−23 13 49.1	0.00	22 59.0
7	18 4 36.07	2.450	23 13 48.4	+0.06	22 56.0
8	18 5 34.80	2.445	23 13 46.3	0.12	22 53.1
9	18 6 33.41	2.440	23 13 42.8	0.18	22 50.1
10	18 7 31.91	2.435	23 13 37.8	0.24	22 47.2
11	18 8 30.28	+2.429	−23 13 31.5	+0.29	22 44.2
12	18 9 28.50	2.423	23 13 23.9	0.35	22 41.2
13	18 10 26.58	2.417	23 13 15.0	0.40	22 38.2
14	18 11 24.51	2.411	23 13 4.9	0.46	22 35.3
15	18 12 22.27	2.404	23 12 53.4	0.51	22 32.3
16	18 13 19.86	+2.397	−23 12 40.6	+0.57	22 29.3
17	18 14 17.29	2.390	23 12 26.5	0.62	22 26.3
18	18 15 14.55	2.383	23 12 11.1	0.67	22 23.4
19	18 16 11.64	2.375	23 11 54.5	0.72	22 20.4
20	18 17 8.54	2.367	23 11 36.7	0.77	22 17.4
21	18 18 5.24	+2.359	−23 11 17.6	+0.82	22 14.4
22	18 19 1.75	2.350	23 10 57.3	0.87	22 11.4
23	18 19 58.05	2.341	23 10 35.9	0.92	22 8.4
24	18 20 54.13	2.332	23 10 13.3	0.97	22 5.4
25	18 21 50.00	2.323	23 9 49.6	1.02	22 2.3
26	18 22 45.65	+2.314	−23 9 24.8	+1.06	21 59.3
27	18 23 41.07	2.304	23 8 58.8	1.11	21 56.3
28	18 24 36.25	2.294	23 8 31.8	1.15	21 53.3
29	18 25 31.19	2.284	23 8 3.7	1.20	21 50.2
30	18 26 25.89	2.273	23 7 34.5	1.24	21 47.2
31	18 27 20.33	+2.262	−23 7 4.3	+1.28	21 44.2
32	18 28 14.50	+2.251	−23 6 33.1	+1.32	21 41.2

Day of the Month.	2d.	10th.	18th.	26th.
	″	″	″	″
Semidiameter . .	15.15	15.23	15.35	15.50
Horizontal Parallax	1.42	1.42	1.43	1.45

FEBRUARY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	18 28 14.50	+2.251	−23 6 33.1	+1.32	21 41.2
2	18 29 8.40	2.240	23 6 0.9	1.36	21 38.1
3	18 30 2.03	2.229	23 5 27.7	1.40	21 35.1
4	18 30 55.37	2.217	23 4 53.5	1.44	21 32.0
5	18 31 48.41	2.205	23 4 18.5	1.48	21 28.9
6	18 32 41.15	+2.192	−23 3 42.6	+1.51	21 25.9
7	18 33 33.58	2.179	23 3 5.8	1.55	21 22.8
8	18 34 25.70	2.165	23 2 28.2	1.58	21 19.7
9	18 35 17.49	2.151	23 1 49.8	1.62	21 16.6
10	18 36 8.96	2.137	23 1 10.6	1.65	21 13.6
11	18 37 0.10	+2.123	−23 0 30.6	+1.68	21 10.5
12	18 37 50.89	2.109	22 59 49.9	1.71	21 7.4
13	18 38 41.33	2.094	22 59 8.5	1.73	21 4.3
14	18 39 31.41	2.079	22 58 26.4	1.76	21 1.2
15	18 40 21.13	2.064	22 57 43.7	1.79	20 58.1
16	18 41 10.48	+2.048	−22 57 0.3	+1.82	20 55.0
17	18 41 59.46	2.032	22 56 16.4	1.84	20 51.9
18	18 42 48.06	2.016	22 55 32.0	1.86	20 48.7
19	18 43 36.27	2.000	22 54 47.1	1.89	20 45.6
20	18 44 24.09	1.984	22 54 1.6	1.91	20 42.4
21	18 45 11.51	+1.967	−22 53 15.7	+1.93	20 39.3
22	18 45 58.53	1.950	22 52 29.3	1.95	20 36.1
23	18 46 45.14	1.933	22 51 42.5	1.96	20 33.0
24	18 47 31.33	1.915	22 50 55.3	1.98	20 29.8
25	18 48 17.09	1.897	22 50 7.8	1.99	20 26.6
26	18 49 2.42	+1.879	−22 49 20.0	+2.00	20 23.4
27	18 49 47.32	1.861	22 48 31.8	2.01	20 20.2
28	18 50 31.77	1.843	22 47 43.4	2.02	20 17.0
29	18 51 15.76	1.823	22 46 54.8	2.03	20 13.8
30	18 51 59.30	1.803	22 46 6.0	2.04	20 10.6
31	18 52 42.37	+1.784	−22 45 17.1	+2.04	20 7.4
32	18 53 24.96	+1.764	−22 44 28.0	+2.05	20 4.2

Day of the Month.	3d.	11th.	19th.	27th.
	″	″	″	″
Semidiameter . .	15.69	15.92	16.18	16.48
Horizontal Parallax	1.47	1.49	1.51	1.54

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

	MARCH.						APRIL.				
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	18 51 15.76	+1.823	−22 46 54.8	+2.03	20 13.8	1	19 9 35.32	+1.088	−22 23 9.8	+1.58	18 29.9
2	18 51 59.30	1.803	22 46 6.0	2.04	20 10.6	2	19 10 1.09	1.060	22 22 32.5	1.54	18 26.4
3	18 52 42.37	1.784	22 45 17.1	2.04	20 7.4	3	19 10 26.18	1.031	22 21 56.1	1.50	18 22.9
4	18 53 24.96	1.764	22 44 28.0	2.05	20 4.2	4	19 10 50.58	1.002	22 21 20.7	1.46	18 19.4
5	18 54 7.06	1.744	22 43 38.8	2.05	20 1.0	5	19 11 14.28	0.973	22 20 46.3	1.42	18 15.8
6	18 54 48.66	+1.723	−22 42 49.6	+2.05	19 57.7	6	19 11 37.28	+0.944	−22 20 12.9	+1.37	18 12.3
7	18 55 29.77	1.702	22 42 0.4	2.04	19 54.5	7	19 11 59.57	0.914	22 19 40.5	1.33	18 8.7
8	18 56 10.37	1.681	22 41 11.2	2.04	19 51.2	8	19 12 21.15	0.884	22 19 9.2	1.28	18 5.1
9	18 56 50.45	1.660	22 40 22.1	2.04	19 47.9	9	19 12 42.02	0.854	22 18 39.0	1.24	18 1.5
10	18 57 30.01	1.638	22 39 33.1	2.03	19 44.6	10	19 13 2.16	0.824	22 18 9.9	1.19	17 57.9
11	18 58 9.05	+1.616	−22 38 44.2	+2.03	19 41.3	11	19 13 21.57	+0.794	−22 17 42.0	+1.14	17 54.3
12	18 58 47.55	1.593	22 37 55.5	2.02	19 38.0	12	19 13 40.25	0.764	22 17 15.3	1.09	17 50.7
13	18 59 25.50	1.570	22 37 7.0	2.01	19 34.7	13	19 13 58.20	0.733	22 16 49.8	1.04	17 47.0
14	19 0 2.91	1.547	22 36 18.8	2.00	19 31.4	14	19 14 15.40	0.702	22 16 25.6	0.99	17 43.4
15	19 0 39.77	1.524	22 35 30.8	1.99	19 28.1	15	19 14 31.85	0.671	22 16 2.6	0.94	17 39.7
16	19 1 16.06	+1.500	−22 34 43.1	+1.98	19 24.7	16	19 14 47.54	+0.639	−22 15 40.9	+0.88	17 36.0
17	19 1 51.78	1.476	22 33 55.8	1.96	19 21.4	17	19 15 2.48	0.607	22 15 20.5	0.83	17 32.3
18	19 2 26.93	1.452	22 33 8.9	1.95	19 18.0	18	19 15 16.66	0.575	22 15 1.4	0.77	17 28.6
19	19 3 1.50	1.428	22 32 22.3	1.93	19 14.7	19	19 15 30.08	0.543	22 14 43.6	0.71	17 24.9
20	19 3 35.48	1.404	22 31 36.2	1.91	19 11.3	20	19 15 42.74	0.511	22 14 27.2	0.65	17 21.2
21	19 4 8.87	+1.379	−22 30 50.6	+1.89	19 7.9	21	19 15 54.63	+0.479	−22 14 12.2	+0.59	17 17.4
22	19 4 41.67	1.354	22 30 5.5	1.87	19 4.5	22	19 16 5.74	0.448	22 13 58.6	0.53	17 13.7
23	19 5 13.87	1.329	22 29 21.0	1.85	19 1.1	23	19 16 16.08	0.415	22 13 46.4	0.47	17 9.9
24	19 5 45.45	1.303	22 28 37.1	1.82	18 57.7	24	19 16 25.64	0.382	22 13 35.5	0.42	17 6.1
25	19 6 16.41	1.277	22 27 53.8	1.80	18 54.3	25	19 16 34.40	0.349	22 13 26.1	0.36	17 2.3
26	19 6 46.76	+1.251	−22 27 11.1	+1.77	18 50.8	26	19 16 42.37	+0.316	−22 13 18.2	+0.30	16 58.5
27	19 7 16.48	1.225	22 26 29.0	1.74	18 47.4	27	19 16 49.55	0.283	22 13 11.8	0.24	16 54.7
28	19 7 45.56	1.198	22 25 47.6	1.71	18 43.9	28	19 16 55.93	0.249	22 13 6.8	0.18	16 50.9
29	19 8 13.98	1.171	22 25 7.0	1.68	18 40.4	29	19 17 1.51	0.215	22 13 3.3	0.12	16 47.0
30	19 8 41.75	1.144	22 24 27.1	1.65	18 36.9	30	19 17 6.29	0.182	22 13 1.3	+0.05	16 43.1
31	19 9 8.87	+1.116	−22 23 48.0	+1.62	18 33.4	31	19 17 10.26	+0.148	−22 13 0.9	−0.01	16 39.2
32	19 9 35.32	+1.088	−22 23 9.8	+1.58	18 29.9	32	19 17 13.41	+0.114	−22 13 2.0	−0.08	16 35.3

Day of the Month.	7th.	15th.	23d.	31st.	Day of the Month.	8th.	16th.	24th.
	″	″	″	″		″	″	″
Semidiameter . .	16.81	17.17	17.57	18.00	Semidiameter	18.45	18.92	19.41
Horizontal Parallax	1.57	1.60	1.64	1.68	Horizontal Parallax . .	1.72	1.77	1.81

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; the sign − indicates that south declinations are increasing.

GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	19 17 10.26	+0.148	−22 13 0.9	−0.01	16 39.2	1	19 12 38.66	−0.849	−22 25 4.5	−1.82	14 32.6
2	19 17 13.41	0.114	22 13 2.0	0.08	16 35.3	2	19 12 17.94	0.877	22 25 48.6	1.86	14 28.3
3	19 17 15.75	0.081	22 13 4.8	0.15	16 31.4	3	19 11 56.55	0.905	22 26 33.7	1.90	14 24.0
4	19 17 17.28	0.047	22 13 9.1	0.21	16 27.5	4	19 11 34.51	0.932	22 27 19.8	1.94	14 19.7
5	19 17 18.00	+0.013	22 13 14.9	0.28	16 23.6	5	19 11 11.84	0.958	22 28 6.9	1.98	14 15.4
6	19 17 17.90	−0.021	−22 13 22.2	−0.34	16 19.7	6	19 10 48.55	−0.983	−22 28 54.9	−2.02	14 11.1
7	19 17 16.98	0.055	22 13 31.2	0.41	16 15.7	7	19 10 24.65	1.008	22 29 43.7	2.05	14 6.8
8	19 17 15.26	0.089	22 13 41.7	0.47	16 11.7	8	19 10 0.17	1.032	22 30 33.3	2.08	14 2.4
9	19 17 12.72	0.122	22 13 53.7	0.53	16 7.7	9	19 9 35.11	1.055	22 31 23.6	2.11	13 58.1
10	19 17 9.36	0.156	22 14 7.2	0.60	16 3.7	10	19 9 9.50	1.077	22 32 14.6	2.14	13 53.7
11	19 17 5.20	−0.190	−22 14 22.2	−0.66	15 59.7	11	19 8 43.34	−1.099	−22 33 6.2	−2.17	13 49.4
12	19 17 0.24	0.223	22 14 38.8	0.73	15 55.7	12	19 8 16.66	1.120	22 33 58.5	2.19	13 45.0
13	19 16 54.48	0.257	22 14 56.9	0.79	15 51.7	13	19 7 49.48	1.141	22 34 51.3	2.21	13 40.6
14	19 16 47.92	0.290	22 15 16.5	0.85	15 47.7	14	19 7 21.82	1.161	22 35 44.5	2.23	13 36.2
15	19 16 40.56	0.323	22 15 37.6	0.91	15 43.6	15	19 6 53.69	1.180	22 36 38.2	2.25	13 31.8
16	19 16 32.41	−0.356	−22 16 0.2	−0.97	15 39.5	16	19 6 25.11	−1.199	−22 37 32.4	−2.27	13 27.4
17	19 16 23.48	0.388	22 16 24.2	1.03	15 35.4	17	19 5 56.10	1.217	22 38 26.9	2.28	13 23.0
18	19 16 13.76	0.421	22 16 49.7	1.09	15 31.3	18	19 5 26.67	1.234	22 39 21.8	2.29	13 18.5
19	19 16 3.27	0.453	22 17 16.6	1.15	15 27.2	19	19 4 56.85	1.250	22 40 17.0	2.30	13 14.1
20	19 15 52.01	0.485	22 17 44.8	1.20	15 23.1	20	19 4 26.65	1.265	22 41 12.4	2.30	13 9.7
21	19 15 39.98	−0.517	−22 18 14.4	−1.26	15 18.9	21	19 3 56.10	−1.280	−22 42 7.9	−2.31	13 5.2
22	19 15 27.18	0.549	22 18 45.4	1.32	15 14.8	22	19 3 25.21	1.294	22 43 3.5	2.32	13 0.7
23	19 15 13.62	0.580	22 19 17.8	1.37	15 10.6	23	19 2 54.00	1.307	22 43 59.2	2.33	12 56.3
24	19 14 59.32	0.611	22 19 51.4	1.43	15 6.5	24	19 2 22.50	1.319	22 44 55.0	2.33	12 51.8
25	19 14 44.27	0.642	22 20 26.3	1.48	15 2.3	25	19 1 50.73	1.330	22 45 50.8	2.33	12 47.4
26	19 14 28.48	−0.673	−22 21 2.5	−1.53	14 58.1	26	19 1 18.70	−1.340	−22 46 46.6	−2.32	12 42.9
27	19 14 11.96	0.703	22 21 39.9	1.58	14 53.9	27	19 0 46.43	1.349	22 47 42.3	2.32	12 38.5
28	19 13 54.71	0.733	22 22 18.5	1.63	14 49.7	28	19 0 13.94	1.357	22 48 37.9	2.31	12 34.0
29	19 13 36.75	0.762	22 22 58.3	1.68	14 45.4	29	18 59 41.27	1.364	22 49 33.3	2.30	12 29.5
30	19 13 18.08	0.791	22 23 39.3	1.73	14 41.2	30	18 59 8.44	1.370	22 50 28.4	2.29	12 25.0
31	19 12 58.71	−0.820	−22 24 21.4	−1.77	14 36.9	31	18 58 35.47	−1.375	−22 51 23.3	−2.28	12 20.5
32	19 12 38.66	−0.849	−22 25 4.5	−1.82	14 32.6	32	18 58 2.39	−1.380	−22 52 18.0	−2.27	12 16.0

Day of the Month.	2d.	10th.	18th.	26th.	Day of the Month.	3d.	11th.	19th.	27th.
	″	″	″	″		″	″	″	″
Semidiameter . .	19.91	20.41	20.88	21.33	Semidiameter . .	21.73	22.06	22.32	22.49
Horizontal Parallax	1.86	1.91	1.95	1.99	Horizontal Parallax	2.03	2.06	2.09	2.10

NOTE.—The sign + indicates north declinations: the sign − indicates south declinations.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	18 58 35.47	−1.375	−22 51 23.3	−2.28	12 20.5	1	18 42 34.73	−1.061	−23 14 54.8	−1.39	10 2.8
2	18 58 2.39	1.380	22 52 18.0	2.27	12 16.0	2	18 42 9.56	1.037	23 15 27.6	1.35	9 58.4
3	18 57 29.22	1.384	22 53 12.3	2.26	12 11.5	3	18 41 44.97	1.012	23 15 59.5	1.32	9 54.1
4	18 56 55.99	1.386	22 54 6.3	2.24	12 7.1	4	18 41 20.97	0.987	23 16 30.6	1.28	9 49.8
5	18 56 22.71	1.387	22 54 59.9	2.22	12 2.7	5	18 40 57.59	0.961	23 17 0.8	1.24	9 45.5
6	18 55 49.42	−1.387	−22 55 53.0	−2.20	11 58.2	6	18 40 34.85	−0.934	−23 17 30.1	−1.20	9 41.2
7	18 55 16.14	1.386	22 56 45.6	2.18	11 53.7	7	18 40 12.75	0.907	23 17 58.5	1.16	9 36.9
8	18 54 42.89	1.384	22 57 37.7	2.16	11 49.2	8	18 39 51.31	0.879	23 18 26.0	1.12	9 32.6
9	18 54 9.70	1.381	22 58 29.3	2.14	11 44.7	9	18 39 30.55	0.851	23 18 52.6	1.09	9 28.3
10	18 53 36.60	1.377	22 59 20.4	2.12	11 40.2	10	18 39 10.46	0.822	23 19 18.3	1.05	9 24.1
11	18 53 3.62	−1.372	−23 0 10.8	−2.09	11 35.8	11	18 38 51.07	−0.793	−23 19 43.1	−1.01	9 19.8
12	18 52 30.77	1.366	23 1 0.6	2.06	11 31.3	12	18 38 32.38	0.764	23 20 7.0	0.97	9 15.6
13	18 51 58.06	1.359	23 1 49.9	2.03	11 26.8	13	18 38 14.41	0.734	23 20 30.0	0.93	9 11.4
14	18 51 25.54	1.351	23 2 38.4	2.00	11 22.3	14	18 37 57.17	0.703	23 20 52.2	0.90	9 7.2
15	18 50 53.22	1.342	23 3 26.1	1.97	11 17.8	15	18 37 40.66	0.672	23 21 13.5	0.87	9 3.0
16	18 50 21.12	−1.332	−23 4 13.1	−1.94	11 13.3	16	18 37 24.89	−0.641	−23 21 34.0	−0.84	8 58.8
17	18 49 49.27	1.322	23 4 59.4	1.91	11 8.9	17	18 37 9.87	0.610	23 21 53.7	0.80	8 54.6
18	18 49 17.68	1.311	23 5 44.9	1.88	11 4.4	18	18 36 55.60	0.579	23 22 12.6	0.77	8 50.4
19	18 48 46.38	1.299	23 6 29.6	1.85	11 0.0	19	18 36 42.10	0.547	23 22 30.7	0.73	8 46.2
20	18 48 15.38	1.286	23 7 13.5	1.82	10 55.5	20	18 36 29.38	0.514	23 22 48.0	0.70	8 42.1
21	18 47 44.71	−1.272	−23 7 56.6	−1.79	10 51.1	21	18 36 17.43	−0.481	−23 23 4.5	−0.67	8 38.0
22	18 47 14.39	1.256	23 8 38.8	1.75	10 46.7	22	18 36 6.27	0.448	23 23 20.3	0.63	8 33.9
23	18 46 44.43	1.240	23 9 20.2	1.72	10 42.3	23	18 35 55.90	0.415	23 23 35.3	0.60	8 29.8
24	18 46 14.86	1.223	23 10 0.9	1.68	10 37.9	24	18 35 46.33	0.382	23 23 49.5	0.57	8 25.7
25	18 45 45.70	1.206	23 10 40.7	1.64	10 33.5	25	18 35 37.56	0.349	23 24 2.9	0.54	8 21.6
26	18 45 16.98	−1.188	−23 11 19.6	−1.60	10 29.1	26	18 35 29.60	−0.315	−23 24 15.5	−0.51	8 17.6
27	18 44 48.69	1.169	23 11 57.6	1.56	10 24.7	27	18 35 22.45	0.281	23 24 27.3	0.48	8 13.5
28	18 44 20.88	1.149	23 12 34.7	1.52	10 20.3	28	18 35 16.13	0.247	23 24 38.4	0.45	8 9.5
29	18 43 53.56	1.128	23 13 11.0	1.49	10 15.9	29	18 35 10.63	0.213	23 24 48.7	0.42	8 5.5
30	18 43 26.75	1.106	23 13 46.5	1.45	10 11.5	30	18 35 5.96	0.178	23 24 58.2	0.39	8 1.5
31	18 43 0.47	−1.084	−23 14 21.1	−1.42	10 7.2	31	18 35 2.12	−0.143	−23 25 7.0	−0.36	7 57.5
32	18 42 34.73	−1.061	−23 14 54.8	−1.39	10 2.8	32	18 34 59.11	−0.108	−23 25 15.1	−0.33	7 53.5

Day of the Month.	5th.	13th.	21st.	29th.	Day of the Month.	6th.	14th.	22d.	30th.
	″	″	″	″		″	″	″	″
Semidiameter . .	22.55	22.51	22.37	22.15	Semidiameter . .	21.85	21.48	21.06	20.60
Horizontal Parallax	2.11	2.10	2.09	2.07	Horizontal Parallax	2.04	2.01	1.97	1.93

The sign − prefixed to the hourly change of declination indicates that south declinations are increasing.

JUPITER, 1913.

GREENWICH MEAN TIME.

SEPTEMBER.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	18 34 59.11	−0.108	−23 25 15.1	−0.33	7 53.5
2	18 34 56.94	0.073	23 25 22.4	0.29	7 49.5
3	18 34 55.60	0.038	23 25 28.9	0.25	7 45.6
4	18 34 55.10	−0.003	23 25 34.6	0.22	7 41.6
5	18 34 55.44	+0.031	23 25 39.6	0.19	7 37.7
6	18 34 56.61	+0.066	−23 25 43.8	−0.16	7 33.8
7	18 34 58.62	0.101	23 25 47.2	0.13	7 29.9
8	18 35 1.47	0.136	23 25 50.0	0.09	7 26.0
9	18 35 5.16	0.171	23 25 52.0	0.06	7 22.2
10	18 35 9.67	0.205	23 25 53.2	−0.03	7 18.3
11	18 35 15.01	+0.240	−23 25 53.6	0.00	7 14.5
12	18 35 21.17	0.274	23 25 53.4	+0.03	7 10.7
13	18 35 28.15	0.308	23 25 52.4	0.06	7 6.9
14	18 35 35.95	0.342	23 25 50.6	0.08	7 3.1
15	18 35 44.57	0.376	23 25 48.0	0.11	6 59.3
16	18 35 54.00	+0.409	−23 25 44.7	+0.14	6 55.5
17	18 36 4.23	0.443	23 25 40.6	0.18	6 51.8
18	18 36 15.26	0.477	23 25 35.7	0.22	6 48.0
19	18 36 27.09	0.510	23 25 30.0	0.25	6 44.3
20	18 36 39.72	0.543	23 25 23.6	0.28	6 40.6
21	18 36 53.15	+0.576	−23 25 16.4	+0.31	6 36.9
22	18 37 7.36	0.609	23 25 8.3	0.35	6 33.2
23	18 37 22.36	0.642	23 24 59.4	0.38	6 29.5
24	18 37 38.15	0.674	23 24 49.8	0.42	6 25.8
25	18 37 54.71	0.706	23 24 39.3	0.46	6 22.1
26	18 38 12.05	+0.738	−23 24 27.9	+0.49	6 18.5
27	18 38 30.16	0.770	23 24 15.6	0.52	6 14.9
28	18 38 49.03	0.802	23 24 2.5	0.56	6 11.3
29	18 39 8.66	0.834	23 23 48.5	0.60	6 7.7
30	18 39 29.04	0.865	23 23 33.6	0.64	6 4.1
31	18 39 50.17	+0.896	−23 23 17.9	+0.68	6 0.5
32	18 40 12.05	+0.926	−23 23 1.2	+0.72	5 57.0

OCTOBER.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	18 39 50.17	+0.896	−23 23 17.9	+0.68	6 0.5
2	18 40 12.05	0.926	23 23 1.2	0.72	5 57.0
3	18 40 34.66	0.957	23 22 43.6	0.76	5 53.4
4	18 40 58.00	0.987	23 22 25.0	0.80	5 49.9
5	18 41 22.06	1.017	23 22 5.5	0.84	5 46.3
6	18 41 46.83	+1.046	−23 21 45.0	+0.88	5 42.8
7	18 42 12.30	1.075	23 21 23.5	0.92	5 39.3
8	18 42 38.48	1.104	23 21 1.0	0.96	5 35.8
9	18 43 5.35	1.133	23 20 37.5	1.00	5 32.3
10	18 43 32.90	1.162	23 20 13.0	1.05	5 28.8
11	18 44 1.12	+1.190	−23 19 47.5	+1.09	5 25.3
12	18 44 30.01	1.218	23 19 20.9	1.13	5 21.9
13	18 44 59.56	1.245	23 18 53.3	1.17	5 18.5
14	18 45 29.76	1.272	23 18 24.6	1.21	5 15.0
15	18 46 0.61	1.299	23 17 54.8	1.26	5 11.5
16	18 46 32.10	+1.325	−23 17 23.9	+1.30	5 8.1
17	18 47 4.23	1.351	23 16 51.9	1.35	5 4.8
18	18 47 36.98	1.377	23 16 18.7	1.40	5 1.4
19	18 48 10.34	1.402	23 15 44.4	1.45	4 58.0
20	18 48 44.31	1.427	23 15 8.9	1.50	4 54.6
21	18 49 18.89	+1.452	−23 14 32.3	+1.55	4 51.3
22	18 49 54.06	1.477	23 13 54.4	1.60	4 47.9
23	18 50 29.82	1.502	23 13 15.3	1.65	4 44.6
24	18 51 6.17	1.527	23 12 35.0	1.70	4 41.3
25	18 51 43.10	1.551	23 11 53.6	1.75	4 38.0
26	18 52 20.60	+1.575	−23 11 10.9	+1.80	4 34.7
27	18 52 58.66	1.598	23 10 26.9	1.85	4 31.4
28	18 53 37.28	1.621	23 9 41.6	1.91	4 28.1
29	18 54 16.45	1.644	23 8 55.0	1.97	4 24.8
30	18 54 56.17	1.667	23 8 7.1	2.03	4 21.5
31	18 55 36.41	+1.689	−23 7 17.8	+2.08	4 18.3
32	18 56 17.17	+1.710	−23 6 27.2	+2.14	4 15.0

Day of the Month.	7th.	15th.	23d.
	″	″	″
Semidiameter	20.12	19.63	19.15
Horizontal Parallax . .	1.88	1.84	1.79

Day of the Month.	1st.	9th.	17th.	25th.
	″	″	″	″
Semidiameter . .	18.69	18.25	17.83	17.44
Horizontal Parallax	1.75	1.70	1.66	1.63

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	18 56 17.17	+1.710	−23 6 27.2	+2.14	4 15.0
2	18 56 58.45	1.731	23 5 35.2	2.19	4 11.8
3	18 57 40.25	1.752	23 4 41.8	2.25	4 8.5
4	18 58 22.54	1.772	23 3 47.0	2.31	4 5.3
5	18 59 5.32	1.792	23 2 50.8	2.37	4 2.1
6	18 59 48.58	+1.812	−23 1 53.1	+2.43	3 58.9
7	19 0 32.31	1.832	23 0 54.0	2.49	3 55.7
8	19 1 16.50	1.851	22 59 53.5	2.55	3 52.5
9	19 2 1.16	1.870	22 58 51.6	2.61	3 49.3
10	19 2 46.27	1.889	22 57 48.3	2.67	3 46.1
11	19 3 31.82	+1.907	−22 56 43.5	+2.73	3 42.9
12	19 4 17.79	1.925	22 55 37.2	2.79	3 39.8
13	19 5 4.19	1.943	22 54 29.4	2.85	3 36.6
14	19 5 51.02	1.960	22 53 20.2	2.92	3 33.5
15	19 6 38.26	1.977	22 52 9.4	2.98	3 30.3
16	19 7 25.90	+1.994	−22 50 57.1	+3.04	3 27.2
17	19 8 13.94	2.010	22 49 43.3	3.10	3 24.0
18	19 9 2.38	2.026	22 48 27.9	3.17	3 20.9
19	19 9 51.20	2.042	22 47 10.9	3.24	3 17.8
20	19 10 40.39	2.057	22 45 52.3	3.31	3 14.7
21	19 11 29.96	+2.072	−22 44 32.2	+3.37	3 11.6
22	19 12 19.90	2.087	22 43 10.5	3.44	3 8.5
23	19 13 10.20	2.102	22 41 47.2	3.50	3 5.4
24	19 14 0.85	2.117	22 40 22.3	3.57	3 2.3
25	19 14 51.84	2.131	22 38 55.8	3.64	2 59.2
26	19 15 43.17	+2.145	−22 37 27.7	+3.71	2 56.1
27	19 16 34.83	2.159	22 35 57.9	3.78	2 53.0
28	19 17 26.81	2.172	22 34 26.5	3.85	2 49.9
29	19 18 19.10	2.185	22 32 53.4	3.91	2 46.8
30	19 19 11.71	2.198	22 31 18.7	3.98	2 43.8
31	19 20 4.62	+2.210	−22 29 42.3	+4.05	2 40.7
32	19 20 57.81	+2.222	−22 28 4.3	+4.12	2 37.7

Day of the Month.	2d.	10th.	18th.	26th.
	″	″	″	″
Semidiameter . .	17.08	16.76	16.47	16.22
Horizontal Parallax	1.59	1.56	1.54	1.52

DECEMBER.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	19 20 4.62	+2.210	−22 29 42.3	+4.05	2 40.7
2	19 20 57.81	2.222	22 28 4.3	4.12	2 37.7
3	19 21 51.28	2.234	22 26 24.7	4.19	2 34.6
4	19 22 45.03	2.245	22 24 43.4	4.26	2 31.6
5	19 23 39.04	2.256	22 23 0.4	4.32	2 28.5
6	19 24 33.31	+2.267	−22 21 15.8	+4.39	2 25.5
7	19 25 27.83	2.277	22 19 29.6	4.46	2 22.5
8	19 26 22.60	2.287	22 17 41.7	4.53	2 19.5
9	19 27 17.61	2.297	22 15 52.2	4.60	2 16.5
10	19 28 12.84	2.306	22 14 1.0	4.66	2 13.5
11	19 29 8.30	+2.315	−22 12 8.2	+4.73	2 10.5
12	19 30 3.98	2.324	22 10 13.8	4.80	2 7.5
13	19 30 59.87	2.333	22 8 17.7	4.87	2 4.5
14	19 31 55.96	2.341	22 6 19.9	4.94	2 1.5
15	19 32 52.25	2.349	22 4 20.5	5.01	1 58.5
16	19 33 48.74	+2.357	−22 2 19.4	+5.08	1 55.5
17	19 34 45.42	2.365	22 0 16.7	5.14	1 52.5
18	19 35 42.27	2.372	21 58 12.3	5.21	1 49.5
19	19 36 39.29	2.379	21 56 6.3	5.28	1 46.5
20	19 37 36.49	2.386	21 53 58.8	5.35	1 43.5
21	19 38 33.86	+2.393	−21 51 49.5	+5.42	1 40.5
22	19 39 31.38	2.400	21 49 38.6	5.49	1 37.6
23	19 40 29.05	2.406	21 47 26.1	5.56	1 34.6
24	19 41 26.87	2.412	21 45 12.0	5.62	1 31.6
25	19 42 24.82	2.417	21 42 56.2	5.69	1 28.6
26	19 43 22.90	+2.422	−21 40 38.8	+5.76	1 25.7
27	19 44 21.10	2.427	21 38 19.8	5.82	1 22.7
28	19 45 19.42	2.432	21 35 59.3	5.89	1 19.7
29	19 46 17.86	2.436	21 33 37.2	5.95	1 16.8
30	19 47 16.39	2.440	21 31 13.5	6.01	1 13.8
31	19 48 15.01	+2.443	−21 28 48.2	+6.08	1 10.9
32	19 49 13.71	+2.447	−21 26 21.4	+6.15	1 7.9

Day of the Month.	4th.	12th.	20th.	28th.	36th.
	″	″	″	″	″
Semidiameter . .	16.00	15.81	15.67	15.55	15.47
Horizontal Parallax	1.49	1.48	1.47	1.46	1.45

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

GREENWICH MEAN TIME.

JANUARY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	3 44 18.80	−0.506	+17 38 15.0	−1.04	9 0.6
2	3 44 6.84	0.490	17 37 50.9	0.98	8 56.5
3	3 43 55.27	0.474	17 37 28.1	0.92	8 52.4
4	3 43 44.10	0.457	17 37 6.7	0.86	8 48.3
5	3 43 33.32	0.440	17 36 46.7	0.80	8 44.2
6	3 43 22.94	−0.423	+17 36 28.2	−0.74	8 40.1
7	3 43 12.97	0.406	17 36 11.1	0.68	8 36.0
8	3 43 3.42	0.389	17 35 55.5	0.62	8 31.9
9	3 42 54.29	0.371	17 35 41.4	0.56	8 27.8
10	3 42 45.59	0.353	17 35 28.7	0.50	8 23.7
11	3 42 37.31	−0.335	+17 35 17.6	−0.44	8 19.6
12	3 42 29.47	0.317	17 35 8.0	0.37	8 15.6
13	3 42 22.06	0.299	17 34 59.9	0.31	8 11.5
14	3 42 15.08	0.281	17 34 53.4	0.24	8 7.5
15	3 42 8.55	0.263	17 34 48.5	0.18	8 3.4
16	3 42 2.47	−0.245	+17 34 45.1	−0.11	7 59.4
17	3 41 56.84	0.226	17 34 43.2	−0.05	7 55.4
18	3 41 51.65	0.207	17 34 42.8	+0.02	7 51.4
19	3 41 46.91	0.188	17 34 44.0	0.08	7 47.4
20	3 41 42.63	0.169	17 34 46.8	0.15	7 43.4
21	3 41 38.81	−0.150	+17 34 51.2	+0.21	7 39.4
22	3 41 35.44	0.131	17 34 57.1	0.27	7 35.4
23	3 41 32.52	0.112	17 35 4.5	0.34	7 31.4
24	3 41 30.06	0.093	17 35 13.5	0.41	7 27.4
25	3 41 28.06	0.074	17 35 24.1	0.47	7 23.4
26	3 41 26.53	−0.055	+17 35 36.3	+0.54	7 19.5
27	3 41 25.45	0.036	17 35 50.1	0.60	7 15.6
28	3 41 24.83	−0.017	17 36 5.4	0.67	7 11.6
29	3 41 24.68	+0.003	17 36 22.3	0.74	7 7.7
30	3 41 24.99	0.022	17 36 40.7	0.80	7 3.8
31	3 41 25.77	+0.042	+17 37 0.7	+0.87	6 59.9
32	3 41 27.01	+0.062	+17 37 22.3	+0.93	6 56.0

FEBRUARY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	3 41 27.01	+0.062	+17 37 22.3	+0.93	6 56.0
2	3 41 28.71	0.081	17 37 45.4	1.00	6 52.1
3	3 41 30.88	0.100	17 38 10.0	1.06	6 48.2
4	3 41 33.52	0.120	17 38 36.2	1.12	6 44.3
5	3 41 36.62	0.139	17 39 3.9	1.19	6 40.4
6	3 41 40.19	+0.158	+17 39 33.1	+1.25	6 36.5
7	3 41 44.22	0.178	17 40 3.8	1.31	6 32.7
8	3 41 48.71	0.197	17 40 36.0	1.37	6 28.8
9	3 41 53.66	0.216	17 41 9.7	1.43	6 25.0
10	3 41 59.07	0.235	17 41 44.9	1.50	6 21.1
11	3 42 4.94	+0.254	+17 42 21.7	+1.56	6 17.3
12	3 42 11.26	0.273	17 42 59.9	1.62	6 13.4
13	3 42 18.03	0.292	17 43 39.5	1.68	6 9.6
14	3 42 25.26	0.311	17 44 20.5	1.74	6 5.8
15	3 42 32.94	0.329	17 45 2.9	1.80	6 2.0
16	3 42 41.06	+0.348	+17 45 46.6	+1.85	5 58.2
17	3 42 49.62	0.366	17 46 31.7	1.91	5 54.4
18	3 42 58.62	0.384	17 47 18.1	1.96	5 50.6
19	3 43 8.05	0.402	17 48 5.9	2.02	5 46.9
20	3 43 17.92	0.420	17 48 55.0	2.07	5 43.1
21	3 43 28.21	+0.438	+17 49 45.4	+2.13	5 39.4
22	3 43 38.93	0.456	17 50 37.0	2.18	5 35.6
23	3 43 50.08	0.473	17 51 29.9	2.23	5 31.9
24	3 44 1.65	0.491	17 52 24.1	2.28	5 28.1
25	3 44 13.64	0.509	17 53 19.5	2.33	5 24.4
26	3 44 26.05	+0.526	+17 54 16.1	+2.38	5 20.7
27	3 44 38.87	0.543	17 55 13.9	2.43	5 17.0
28	3 44 52.10	0.560	17 56 12.9	2.48	5 13.3
29	3 45 5.74	0.577	17 57 13.0	2.53	5 9.6
30	3 45 19.78	0.594	17 58 14.3	2.57	5 5.9
31	3 45 34.23	+0.611	+17 59 16.7	+2.62	5 2.2
32	3 45 49.08	+0.627	+18 0 20.2	+2.67	4 58.5

Day of the Month.	2d.	10th.	18th.	26th.
	″	″	″	″
Semidiameter . .	9.29	9.18	9.06	8.94
Horizontal Parallax	1.06	1.04	1.03	1.01

Day of the Month.	3d.	11th.	19th.	27th.
	″	″	″	″
Semidiameter . .	8.81	8.68	8.55	8.43
Horizontal Parallax	1.00	0.98	0.97	0.96

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	3 45 5.74	+0.577	+17 57 13.0	+2.53	5 9.6	1	3 55 9.79	+1.019	+18 35 53.3	+3.56	3 17.7
2	3 45 19.78	0.594	17 58 14.3	2.57	5 5.9	2	3 55 34.37	1.030	18 37 18.9	3.58	3 14.2
3	3 45 34.23	0.611	17 59 16.7	2.62	5 2.2	3	3 55 59.22	1.041	18 38 44.9	3.59	3 10.7
4	3 45 49.08	0.627	18 0 20.2	2.67	4 58.5	4	3 56 24.34	1.052	18 40 11.3	3.61	3 7.2
5	3 46 4.32	0.643	18 1 24.8	2.71	4 54.8	5	3 56 49.73	1.063	18 41 38.2	3.63	3 3.7
6	3 46 19.95	+0.659	+18 2 30.4	+2.76	4 51.1	6	3 57 15.37	+1.074	+18 43 5.4	+3.64	3 0.2
7	3 46 35.97	0.675	18 3 37.1	2.80	4 47.5	7	3 57 41.26	1.084	18 44 32.9	3.66	2 56.7
8	3 46 52.37	0.691	18 4 44.8	2.84	4 43.8	8	3 58 7.41	1.094	18 46 0.8	3.67	2 53.2
9	3 47 9.15	0.707	18 5 53.5	2.88	4 40.2	9	3 58 33.80	1.104	18 47 29.0	3.68	2 49.7
10	3 47 26.31	0.723	18 7 3.1	2.92	4 36.5	10	3 59 0.42	1.114	18 48 57.4	3.69	2 46.2
11	3 47 43.84	+0.738	+18 8 13.7	+2.96	4 32.9	11	3 59 27.28	+1.124	+18 50 26.1	+3.70	2 42.7
12	3 48 1.74	0.753	18 9 25.2	3.00	4 29.2	12	3 59 54.37	1.133	18 51 55.0	3.71	2 39.2
13	3 48 20.00	0.768	18 10 37.6	3.04	4 25.6	13	4 0 21.68	1.142	18 53 24.1	3.71	2 35.7
14	3 48 38.62	0.783	18 11 50.9	3.08	4 22.0	14	4 0 49.20	1.151	18 54 53.4	3.72	2 32.3
15	3 48 57.59	0.798	18 13 5.0	3.11	4 18.4	15	4 1 16.94	1.160	18 56 22.9	3.73	2 28.8
16	3 49 16.91	+0.812	+18 14 20.0	+3.14	4 14.8	16	4 1 44.89	+1.169	+18 57 52.5	+3.73	2 25.3
17	3 49 36.57	0.826	18 15 35.8	3.17	4 11.2	17	4 2 13.04	1.177	18 59 22.2	3.74	2 21.8
18	3 49 56.57	0.840	18 16 52.3	3.20	4 7.6	18	4 2 41.39	1.185	19 0 52.0	3.74	2 18.4
19	3 50 16.91	0.854	18 18 9.6	3.23	4 4.0	19	4 3 9.94	1.193	19 2 21.9	3.75	2 14.9
20	3 50 37.58	0.868	18 19 27.6	3.26	4 0.4	20	4 3 38.67	1.201	19 3 51.8	3.75	2 11.5
21	3 50 58.57	+0.882	+18 20 46.3	+3.29	3 56.8	21	4 4 7.59	+1.209	+19 5 21.8	+3.75	2 8.0
22	3 51 19.88	0.895	18 22 5.8	3.32	3 53.2	22	4 4 36.69	1.217	19 6 51.8	3.75	2 4.6
23	3 51 41.50	0.908	18 23 25.9	3.35	3 49.6	23	4 5 5.97	1.224	19 8 21.9	3.75	2 1.1
24	3 52 3.44	0.921	18 24 46.6	3.38	3 46.0	24	4 5 35.43	1.231	19 9 52.0	3.75	1 57.7
25	3 52 25.69	0.934	18 26 7.9	3.40	3 42.5	25	4 6 5.06	1.238	19 11 22.0	3.75	1 54.2
26	3 52 48.25	+0.946	+18 27 29.9	+3.43	3 38.9	26	4 6 34.85	+1.245	+19 12 52.0	+3.75	1 50.8
27	3 53 11.11	0.959	18 28 52.5	3.45	3 35.4	27	4 7 4.80	1.252	19 14 22.0	3.74	1 47.4
28	3 53 34.27	0.971	18 30 15.6	3.48	3 31.8	28	4 7 34.91	1.258	19 15 51.9	3.74	1 43.9
29	3 53 57.72	0.983	18 31 39.2	3.50	3 28.3	29	4 8 5.18	1.264	19 17 21.7	3.74	1 40.5
30	3 54 21.46	0.995	18 33 3.4	3.52	3 24.8	30	4 8 35.59	1.270	19 18 51.4	3.74	1 37.1
31	3 54 45.48	+1.007	+18 34 28.1	+3.54	3 21.3	31	4 9 6.14	+1.276	+19 20 20.9	+3.73	1 33.6
32	3 55 9.79	+1.019	+18 35 53.3	+3.56	3 17.7	32	4 9 36.84	+1.282	+19 21 50.3	+3.73	1 30.2

Day of the Month.	7th.	15th.	23d.	31st.	Day of the Month.	8th.	16th.	24th.
	″	″	″	″		″	″	″
Semidiameter . .	8.31	8.20	8.10	8.01	Semidiameter	7.93	7.87	7.81
Horizontal Parallax	0.95	0.93	0.92	0.91	Horizontal Parallax . . .	0.90	0.89	0.89

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

GREENWICH MEAN TIME.

MAY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	4 9 6.14	+1.276	+19 20 20.9	+3.73	1 33.6
2	4 9 36.84	1.282	19 21 50.5	3.73	1 30.2
3	4 10 7.68	1.287	19 23 19.6	3.72	1 26.8
4	4 10 38.64	1.292	19 24 48.7	3.71	1 23.4
5	4 11 9.72	1.297	19 26 17.6	3.70	1 20.0
6	4 11 40.92	+1.302	+19 27 46.2	+3.69	1 16.6
7	4 12 12.25	1.307	19 29 14.6	3.68	1 13.1
8	4 12 43.68	1.312	19 30 42.8	3.67	1 9.7
9	4 13 15.21	1.316	19 32 10.7	3.66	1 6.3
10	4 13 46.84	1.320	19 33 38.3	3.65	1 2.9
11	4 14 18.57	+1.324	+19 35 5.6	+3.64	0 59.5
12	4 14 50.39	1.328	19 36 32.6	3.62	0 56.1
13	4 15 22.30	1.331	19 37 59.3	3.61	0 52.7
14	4 15 54.29	1.334	19 39 25.6	3.59	0 49.3
15	4 16 26.36	1.337	19 40 51.6	3.58	0 45.9
16	4 16 58.49	+1.340	+19 42 17.2	+3.56	0 42.5
17	4 17 30.69	1.343	19 43 42.4	3.55	0 39.1
18	4 18 2.96	1.346	19 45 7.2	3.53	0 35.7
19	4 18 35.29	1.349	19 46 31.6	3.51	0 32.3
20	4 19 7.67	1.351	19 47 55.6	3.49	0 28.9
21	4 19 40.10	+1.353	+19 49 19.2	+3.47	0 25.5
22	4 20 12.58	1.355	19 50 42.3	3.45	0 22.1
23	4 20 45.11	1.357	19 52 5.0	3.43	0 18.7
24	4 21 17.67	1.358	19 53 27.2	3.41	0 15.4
25	4 21 50.26	1.359	19 54 48.9	3.39	0 12.0
26	4 22 22.89	+1.360	+19 56 10.2	+3.37	0 8.6
27	4 22 55.55	1.361	19 57 31.0	3.35	0 5.2
28	4 23 28.23	1.362	19 58 51.2	3.33	0 1.8 23 58.4
29	4 24 0.92	1.362	20 0 10.9	3.31	23 55.0
30	4 24 33.63	1.363	20 1 30.1	3.29	23 51.6
31	4 25 6.35	+1.363	+20 2 48.8	+3.27	23 48.2
32	4 25 39.07	+1.363	+20 4 6.9	+3.25	23 44.8

JUNE.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	4 25 39.07	+1.363	+20 4 6.9	+3.25	23 44.8
2	4 26 11.79	1.363	20 5 24.4	3.22	23 41.4
3	4 26 44.51	1.363	20 6 41.3	3.19	23 38.0
4	4 27 17.22	1.362	20 7 57.7	3.17	23 34.6
5	4 27 49.91	1.362	20 9 13.5	3.14	23 31.2
6	4 28 22.58	+1.361	+20 10 28.7	+3.12	23 27.9
7	4 28 55.23	1.360	20 11 43.2	3.10	23 24.5
8	4 29 27.84	1.358	20 12 57.1	3.07	23 21.1
9	4 30 0.41	1.357	20 14 10.4	3.05	23 17.7
10	4 30 32.94	1.355	20 15 23.0	3.02	23 14.3
11	4 31 5.44	+1.353	+20 16 35.0	+2.99	23 10.9
12	4 31 37.89	1.351	20 17 46.3	2.96	23 7.5
13	4 32 10.28	1.348	20 18 56.9	2.93	23 4.1
14	4 32 42.61	1.346	20 20 6.9	2.90	23 0.7
15	4 33 14.88	1.343	20 21 16.3	2.87	22 57.3
16	4 33 47.09	+1.340	+20 22 25.0	+2.84	22 53.9
17	4 34 19.22	1.337	20 23 32.9	2.81	22 50.5
18	4 34 51.28	1.334	20 24 40.2	2.78	22 47.1
19	4 35 23.27	1.331	20 25 46.8	2.75	22 43.7
20	4 35 55.18	1.328	20 26 52.7	2.73	22 40.3
21	4 36 26.99	+1.324	+20 27 57.9	+2.70	22 36.9
22	4 36 58.71	1.320	20 29 2.4	2.67	22 33.5
23	4 37 30.34	1.316	20 30 6.1	2.64	22 30.1
24	4 38 1.87	1.312	20 31 9.1	2.61	22 26.7
25	4 38 33.30	1.307	20 32 11.4	2.58	22 23.3
26	4 39 4.62	+1.303	+20 33 13.0	+2.55	22 19.9
27	4 39 35.83	1.298	20 34 13.9	2.52	22 16.5
28	4 40 6.92	1.293	20 35 14.1	2.49	22 13.1
29	4 40 37.88	1.288	20 36 13.5	2.46	22 9.7
30	4 41 8.72	1.282	20 37 12.1	2.43	22 6.2
31	4 41 39.44	+1.277	+20 38 9.9	+2.40	22 2.8
32	4 42 10.02	+1.271	+20 39 6.9	+2.36	21 59.4

Day of the Month.	2d.	10th.	18th.	26th.
	″	″	″	″
Semidiameter . .	7.76	7.73	7.71	7.70
Horizontal Parallax	0.88	0.88	0.88	0.87

Day of the Month.	3d.	11th.	19th.	27th.
	″	″	″	″
Semidiameter . .	7.70	7.71	7.73	7.77
Horizontal Parallax	0.87	0.88	0.88	0.88

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	4 41 39.44	+1.277	+20 38 9.9	+2.40	22 2.8	1	4 56 0.12	+1.007	+21 1 39.2	+1.39	20 15.1
2	4 42 10.02	1.271	20 39 6.9	2.36	21 59.4	2	4 56 24.14	0.995	21 2 12.2	1.36	20 11.6
3	4 42 40.45	1.265	20 40 3.2	2.33	21 56.0	3	4 56 47.87	0.983	21 2 44.5	1.33	20 8.0
4	4 43 10.73	1.259	20 40 58.8	2.30	21 52.5	4	4 57 11.30	0.971	21 3 16.1	1.30	20 4.5
5	4 43 40.86	1.253	20 41 53.6	2.27	21 49.1	5	4 57 34.44	0.958	21 3 46.9	1.26	20 0.9
6	4 44 10.84	+1.246	+20 42 47.6	+2.24	21 45.6	6	4 57 57.29	+0.945	+21 4 16.9	+1.23	19 57.4
7	4 44 40.65	1.239	20 43 40.8	2.20	21 42.2	7	4 58 19.83	0.932	21 4 46.1	1.20	19 53.8
8	4 45 10.29	1.232	20 44 33.3	2.17	21 38.7	8	4 58 42.06	0.919	21 5 14.6	1.17	19 50.2
9	4 45 39.77	1.225	20 45 25.0	2.14	21 35.3	9	4 59 3.96	0.906	21 5 42.3	1.14	19 46.6
10	4 46 9.07	1.217	20 46 15.9	2.11	21 31.8	10	4 59 25.54	0.893	21 6 9.3	1.11	19 43.1
11	4 46 38.18	+1.209	+20 47 6.0	+2.08	21 28.4	11	4 59 46.81	+0.880	+21 6 35.5	+1.08	19 39.5
12	4 47 7.10	1.201	20 47 55.4	2.04	21 24.9	12	5 0 7.75	0.866	21 7 1.0	1.05	19 35.9
13	4 47 35.83	1.193	20 48 44.0	2.01	21 21.5	13	5 0 28.36	0.852	21 7 25.8	1.02	19 32.3
14	4 48 4.37	1.185	20 49 31.8	1.98	21 18.0	14	5 0 48.63	0.838	21 7 49.9	0.99	19 28.7
15	4 48 32.71	1.177	20 50 18.8	1.95	21 14.6	15	5 1 8.57	0.824	21 8 13.3	0.96	19 25 1
16	4 49 0.86	+1.169	+20 51 5.0	+1.92	21 11.1	16	5 1 28.16	+0.810	+21 8 35.9	+0.93	19 21.5
17	4 49 28.80	1.160	20 51 50.5	1.88	21 7.6	17	5 1 47.41	0.795	21 8 57.8	0.90	19 17.8
18	4 49 56.53	1.151	20 52 35.2	1.85	21 4.2	18	5 2 6.31	0.780	21 9 19.0	0.87	19 14.2
19	4 50 24.04	1.142	20 53 19.1	1.82	21 0.7	19	5 2 24.86	0.765	21 9 39.5	0.84	19 10.6
20	4 50 51.33	1.133	20 54 2.2	1.78	20 57.2	20	5 2 43.04	0.750	21 9 59.3	0.81	19 7.0
21	4 51 18.41	+1.123	+20 54 44.5	+1.75	20 53.7	21	5 3 0.86	+0.735	+21 10 18.4	+0.78	19 3.3
22	4 51 45.26	1.114	20 55 26.1	1.72	20 50.2	22	5 3 18.32	0.720	21 10 36.7	0.75	18 59.7
23	4 52 11.87	1.104	20 56 6.9	1.69	20 46.7	23	5 3 35.41	0.704	21 10 54.4	0.72	18 56.0
24	4 52 38.24	1.094	20 56 46.9	1.66	20 43.2	24	5 3 52.12	0.688	21 11 11.4	0.69	18 52.4
25	4 53 4.38	1.084	20 57 26.2	1.62	20 39.7	25	5 4 8.45	0.672	21 11 27.7	0.66	18 48.7
26	4 53 30.27	+1.073	+20 58 4.7	+1.59	20 36.2	26	5 4 24.39	+0.656	+21 11 43.2	+0.63	18 45.1
27	4 53 55.90	1.063	20 58 42.4	1.55	20 32.7	27	5 4 39.94	0.640	21 11 58.1	0.61	18 41.4
28	4 54 21.28	1.052	20 59 19.3	1.52	20 29.2	28	5 4 55.09	0.623	21 12 12.3	0.58	18 37.7
29	4 54 46.40	1.041	20 59 55.4	1.49	20 25.7	29	5 5 9.85	0.607	21 12 25.8	0.55	18 34.0
30	4 55 11.25	1.030	21 0 30.8	1.46	20 22.2	30	5 5 24.21	0.590	21 12 38.7	0.52	18 30.3
31	4 55 35.82	+1.019	+21 1 5.4	+1.42	20 18.7	31	5 5 38.16	+0.573	+21 12 50.9	+0.49	18 26.6
32	4 56 0.12	+1.007	+21 1 39.2	+1.39	20 15.1	32	5 5 51.69	+0.555	+21 13 2.4	+0.46	18 22.9

Day of the Month.	5th.	13th.	21st.	29th.	Day of the Month.	6th.	14th.	22d.	30th.
	″	″	″	″		″	″	″	″
Semidiameter . .	7.82	7.88	7.95	8.03	Semidiameter . .	8.12	8.22	8.33	8.44
Horizontal Parallax	0.89	0.89	0.90	0.91	Horizontal Parallax	0.92	0.93	0.95	0.96

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

SATURN, 1913.

GREENWICH MEAN TIME.

	SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.	Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	5 5 51.69	+0.555	+21 13 2.4	+0.46	18 22.9	1	5 9 12.95	−0.010	+21 14 1.2	−0.28	16 28.1
2	5 6 4.81	0.538	21 13 13.2	0.43	18 19.1	2	5 9 12.48	0.029	21 13 54.2	0.31	16 24.1
3	5 6 17.52	0.520	21 13 23.3	0.41	18 15.4	3	5 9 11.53	0.049	21 13 46.7	0.33	16 20.2
4	5 6 29.80	0.503	21 13 32.8	0.38	18 11.7	4	5 9 10.11	0.069	21 13 38.7	0.35	16 16.2
5	5 6 41.66	0.485	21 13 41.7	0.35	18 8.0	5	5 9 8.22	0.089	21 13 30.2	0.37	16 12.2
6	5 6 53.09	+0.467	+21 13 50.0	+0.33	18 4.2	6	5 9 5.85	−0.109	+21 13 21.1	−0.39	16 8.2
7	5 7 4.09	0.449	21 13 57.7	0.30	18 0.5	7	5 9 3.01	0.128	21 13 11.5	0.41	16 4.3
8	5 7 14.66	0.431	21 14 4.7	0.28	17 56.7	8	5 8 59.71	0.147	21 13 1.5	0.43	16 0.3
9	5 7 24.79	0.413	21 14 11.1	0.25	17 52.9	9	5 8 55.94	0.167	21 12 51.0	0.45	15 56.3
10	5 7 34.48	0.395	21 14 16 9	0.23	17 49.1	10	5 8 51 70	0.186	21 12 39.9	0.47	15 52.3
11	5 7 43.73	+0.376	+21 14 22.0	+0.20	17 45.3	11	5 8 47.00	−0.205	+21 12 28.3	−0.49	15 48.3
12	5 7 52.54	0.358	21 14 26.5	0.18	17 41.5	12	5 8 41.84	0.224	21 12 16.3	0.51	15 44.2
13	5 8 0.91	0.339	21 14 30.4	0.15	17 37.7	13	5 8 36.22	0.243	21 12 3.8	0.53	15 40.2
14	5 8 8.83	0.321	21 14 33.7	0.13	17 33.9	14	5 8 30.14	0.262	21 11 50.8	0.55	15 36.1
15	5 8 16.30	0.302	21 14 36.5	0.10	17 30.1	15	5 8 23.61	0.281	21 11 37.3	0.57	15 32.1
16	5 3 23.31	+0.283	+21 14 38.6	+0.08	17 26.3	16	5 8 16.63	−0.300	+21 11 23.3	−0.59	15 28.1
17	5 8 29.87	0.264	21 14 40.1	0.06	17 22.5	17	5 8 9.20	0.319	21 11 8.8	0.61	15 24.0
18	5 8 35.98	0.244	21 14 41.0	+0.03	17 18.6	18	5 8 1.32	0.338	21 10 53.8	0.63	15 19.9
19	5 8 41.63	0.225	21 14 41.4	0.00	17 14.8	19	5 7 53.00	0.356	21 10 38.4	0.65	15 15.9
20	5 8 46.82	0.206	21 14 41.2	−0.02	17 10.9	20	5 7 44.24	0.374	21 10 22.5	0.67	15 11.8
21	5 8 51.55	+0.187	+21 14 40.4	−0.05	17 7.1	21	5 7 35.05	−0.392	+21 10 6.2	−0.69	15 7.7
22	5 8 55.81	0.168	21 14 39.0	0.08	17 3.2	22	5 7 25.42	0.410	21 9 49.4	0.71	15 3.6
23	5 8 59.61	0.148	21 14 37.1	0.10	16 59.4	23	5 7 15.36	0.428	21 9 32.2	0.73	14 59.5
24	5 9 2.94	0.129	21 14 34.6	0.12	16 55.5	24	5 7 4.88	0.446	21 9 14.5	0.75	14 55.4
25	5 9 5.79	0.109	21 14 31.5	0.14	16 51.6	25	5 6 53.97	0.463	21 8 56.4	0.76	14 51.3
26	5 9 8.17	+0.089	+21 14 27.8	−0.16	16 47.7	26	5 6 42.65	−0.480	+21 8 37.8	−0.78	14 47.2
27	5 9 10.08	0.070	21 14 23.6	0.18	16 43.8	27	5 6 30.92	0.497	21 8 18.8	0.80	14 43.1
28	5 9 11.51	0.050	21 14 18.8	0.21	16 39.9	28	5 6 18.79	0.514	21 7 59.4	0.82	14 38.9
29	5 9 12.46	0.030	21 14 13.5	0.23	16 36.0	29	5 6 6.25	0.531	21 7 39.5	0.84	14 34.8
30	5 9 12.94	+0.010	21 14 7.6	0.26	16 32.0	30	5 5 53.32	0.547	21 7 19.2	0.85	14 30.6
31	5 9 12.95	−0.010	+21 14 1.2	−0.28	16 28.1	31	5 5 40.01	−0.563	+21 6 58.5	−0.87	14 26.4
32	5 9 12.48	−0.029	+21 13 54.2	−0.31	16 24.1	32	5 5 26.32	−0.578	+21 6 37.5	−0.89	14 22.3

Day of the Month.	7th.	15th.	23d.	Day of the Month.	1st.	9th.	17th.	25th.
	″	″	″		″	″	″	″
Semidiameter	8.56	8.69	8.82	Semidiameter . .	8.95	9.08	9.20	9.31
Horizontal Parallax . .	0.97	0.99	1.00	Horizontal Parallax	1.02	1.03	1.05	1.06

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	5 5 26.32	−0.578	+21 6 37.5	−0.89	14 22.3	1	4 56 22.47	−0.870	+20 53 46.8	−1.18	12 15.2
2	5 5 12.26	0.593	21 6 16.1	0.90	14 18.1	2	4 56 1.55	0.873	20 53 18.4	1.18	12 10.9
3	5 4 57.84	0.608	21 5 54.3	0.92	14 13.9	3	4 55 40.57	0.875	20 52 50.0	1.18	12 6.6
4	5 4 43.06	0.623	21 5 32.1	0.93	14 9.7	4	4 55 19.54	0.877	20 52 21.7	1.18	12 2.3
5	5 4 27.93	0.637	21 5 9.6	0.95	14 5.6	5	4 54 58.47	0.878	20 51 53.4	1.18	11 58.1
6	5 4 12.46	−0.651	+21 4 46.7	−0.96	14 1.4	6	4 54 37.39	−0.878	+20 51 25.1	−1.18	11 53.8
7	5 3 56.67	0.665	21 4 23.4	0.98	13 57.2	7	4 54 16.31	0.879	20 50 56.8	1.17	11 49.6
8	5 3 40.56	0.678	21 3 59.8	0.99	13 53.0	8	4 53 55.23	0.878	20 50 28.6	1.17	11 45.3
9	5 3 24.14	0.691	21 3 35.9	1.00	13 48.8	9	4 53 34.17	0.877	20 50 0.5	1.16	11 41.0
10	5 3 7.41	0.703	21 3 11.6	1.02	13 44.6	10	4 53 13.13	0.876	20 49 32.5	1.16	11 36.7
11	5 2 50.38	−0.715	+21 2 47.0	−1.03	13 40.4	11	4 52 52.13	−0.874	+20 49 4.7	−1.15	11 32.4
12	5 2 33.07	0.727	21 2 22.1	1.04	13 36.1	12	4 52 31.18	0.872	20 48 37.1	1.15	11 28.2
13	5 2 15.48	0.738	21 1 57.0	1.06	13 31.9	13	4 52 10.29	0.869	20 48 9.6	1.14	11 24.0
14	5 1 57.61	0.749	21 1 31.6	1.07	13 27.7	14	4 51 49.48	0.865	20 47 42.3	1.13	11 19.7
15	5 1 39.48	0.760	21 1 5.9	1.08	13 23.5	15	4 51 28.76	0.862	20 47 15.2	1.12	11 15.4
16	5 1 21.11	−0.770	+21 0 39.9	−1.09	13 19.2	16	4 51 8.13	−0.858	+20 46 48.3	−1.11	11 11.0
17	5 1 2.50	0.780	21 0 13.7	1.10	13 15.0	17	4 50 47.61	0.853	20 46 21.7	1.10	11 6.8
18	5 0 43.65	0.789	20 59 47.2	1.11	13 10.8	18	4 50 27.22	0.848	20 45 55.4	1.09	11 2.5
19	5 0 24.58	0.798	20 59 20.5	1.12	13 6.6	19	4 50 6.96	0.842	20 45 29.3	1.08	10 58.2
20	5 0 5.30	0.807	20 58 53.6	1.13	13 2.3	20	4 49 46.83	0.836	20 45 3.5	1.07	10 53.9
21	4 59 45.82	−0.815	+20 58 26.4	−1.14	12 58.0	21	4 49 26.85	−0.829	+20 44 38.1	−1.06	10 49.7
22	4 59 26.15	0.823	20 57 59.0	1.14	12 53.7	22	4 49 7.05	0.822	20 44 13.1	1.04	10 45.5
23	4 59 6.31	0.830	20 57 31.4	1.15	12 49.4	23	4 48 47.43	0.814	20 43 48.4	1.03	10 41.2
24	4 58 46.30	0.837	20 57 3.7	1.15	12 45.2	24	4 48 28.00	0.806	20 43 24.0	1.01	10 36.9
25	4 58 26.14	0.843	20 56 35.9	1.16	12 40.9	25	4 48 8.77	0.797	20 43 0.1	0.99	10 32.7
26	4 58 5.82	−0.849	+20 56 8.0	−1.16	12 36.7	26	4 47 49.75	−0.788	+20 42 36.7	−0.97	10 28.5
27	4 57 45.36	0.854	20 55 39.9	1.17	12 32.4	27	4 47 30.95	0.778	20 42 13.7	0.95	10 24.2
28	4 57 24.79	0.859	20 55 11.7	1.17	12 28.1	28	4 47 12.38	0.768	20 41 51.2	0.93	10 20.0
29	4 57 4.11	0.863	20 54 43.5	1.18	12 23.8	29	4 46 54.06	0.758	20 41 29.2	0.91	10 15.8
30	4 56 43.33	0.867	20 54 15.2	1.18	12 19.5	30	4 46 36.01	0.747	20 41 7.8	0.88	10 11.5
31	4 56 22.47	−0.870	+20 53 46.8	−1.18	12 15.2	31	4 46 18.23	−0.735	+20 40 46.9	−0.86	10 7.3
32	4 56 1.55	−0.873	+20 53 18.4	−1.18	12 10.9	32	4 46 0.71	−0.724	+20 40 26.6	−0.83	10 3.1

Day of the Month.	2d.	10th.	18th.	26th.	Day of the Month.	4th.	12th.	20th.	28th.	36th.
	″	″	″	″		″	″	″	″	″
Semidiameter . .	9.41	9.49	9.56	9.60	Semidiameter . . .	9.62	9.62	9.59	9.54	9.47
Horizontal Parallax	1.07	1.08	1.09	1.09	Horizontal Parallax .	1.09	1.09	1.09	1.08	1.08

The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

URANUS, 1913.

GREENWICH MEAN TIME.

Month and Day.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m
Jan. 2	20 18 38.20	+13.900	−20 13 0.7	+45.72	1 32.3
6	20 19 34.30	14.139	20 9 55.8	46.71	1 17.5
10	20 20 31.24	14.324	20 6 47.3	47.53	1 2.8
14	20 21 28.82	14.457	20 3 35.8	48.18	0 48.0
18	20 22 26.83	14.541	20 0 22.1	48.65	0 33.2
22	20 23 25.08	+14.574	−19 57 6.9	+48.94	0 18.5
26	20 24 23.36	14.560	19 53 50.7	49.13	0 3.7
30	20 25 21.50	14.502	19 50 34.1	49.15	23 45.2
Feb. 3	20 26 19.31	14.395	19 47 17.8	48.98	23 30.4
7	20 27 16.59	14.235	19 44 2.5	48.61	23 15.7
11	20 28 13.12	+14.021	−19 40 49.1	+48.07	23 0.9
15	20 29 8.70	13.763	19 37 38.2	47.36	22 46.1
19	20 30 3.16	13.462	19 34 30.5	46.46	22 31.3
23	20 30 56.35	13.121	19 31 26.7	45.41	22 16.4
27	20 31 48.09	12.737	19 28 27.4	44.19	22 1.5
Mar. 3	20 32 38.20	+12.310	−19 25 33.4	+42.80	21 46.6
7	20 33 26.51	11.838	19 22 45.3	41.23	21 31.7
11	20 34 12.85	11.325	19 20 3.8	39.48	21 16.7
15	20 34 57.06	10.774	19 17 29.7	37.56	21 1.7
19	20 35 39.00	10.192	19 15 3.5	35.52	20 46.7
23	20 36 18.55	+ 9.579	−19 12 45.7	+33.35	20 31.6
27	20 36 55.59	8.935	19 10 36.9	31.03	20 16.5
31	20 37 29.99	8.260	19 8 37.6	28.58	20 1.3
Apr. 4	20 38 1.63	7.557	19 6 48.4	26.02	19 46.1
8	20 38 30.41	6.828	19 5 9.6	23.35	19 30.8
12	20 38 56.22	+ 6.075	−19 3 41.8	+20.53	19 15.5
16	20 39 18.99	5.307	19 2 25.4	17.67	19 0.2
20	20 39 38.66	4.527	19 1 20.5	14.77	18 44.8
24	20 39 55.19	3.736	19 0 27.4	11.78	18 29.3
28	20 40 8.53	2.933	18 59 46.3	8.74	18 13.8
May 2	20 40 18.63	+ 2.118	−18 59 17.4	+ 5.70	17 58.2
6	20 40 25.47	1.298	18 59 0.7	+ 2.64	17 42.6
10	20 40 29.03	+ 0.481	18 58 56.3	− 0.42	17 26.9
14	20 40 29.33	− 0.328	18 59 4.1	3.47	17 11.2
18	20 40 26.42	1.126	18 59 24.0	6.45	16 55.4
22	20 40 20.34	− 1.912	−18 59 55.6	− 9.36	16 39.6
26	20 40 11.14	2.686	19 0 38.8	12.21	16 23.7
30	20 39 58.89	3.442	19 1 33.2	14.97	16 7.7
June 3	20 39 43.65	4.175	19 2 38.5	17.64	15 51.7
7	20 39 25.53	4.879	19 3 54.2	20.19	15 35.7
11	20 39 4.66	− 5.549	−19 5 19.8	−22.58	15 19.6
15	20 38 41.19	6.181	19 6 54.6	24.78	15 3.5
19	20 38 15.27	6.771	19 8 37.8	26.82	14 47.3
23	20 37 47.08	7.321	19 10 28.9	28.69	14 31.1
27	20 37 16.76	7.831	19 12 27.1	30.38	14 14.9
July 1	20 36 44.50	− 8.289	−19 14 31.6	−31.84	13 58.6
5	20 36 10.52	− 8.693	−19 16 41.5	−33.09	13 42.3
July 1	20 36 44.50	− 8.289	−19 14 31.6	−31.84	13 58.6
5	20 36 10.52	8.693	19 16 41.5	33.09	13 42.3
9	20 35 35.03	9.039	19 18 56.0	34.10	13 26.0
13	20 34 58.29	9.324	19 21 14.0	34.86	13 9.7
17	20 34 20.52	9.547	19 23 34.6	35.40	12 53.3
21	20 33 41.99	− 9.714	−19 25 56.9	−35.72	12 36.9
25	20 33 2.90	9.821	19 28 20.1	35.83	12 20.6
29	20 32 23.51	9.862	19 30 43.2	35.69	12 4.2
Aug. 2	20 31 44.09	9.836	19 33 5.2	35.29	11 47.8
6	20 31 4.91	9.741	19 35 25.2	34.66	11 31.4
10	20 30 26.25	− 9.579	−19 37 42.2	−33.80	11 15.1
14	20 29 48.36	9.356	19 39 55.4	32.74	10 58.7
18	20 29 11.48	9.072	19 42 3.9	31.47	10 42.4
22	20 28 35.85	8.733	19 44 6.9	30.00	10 26.1
26	20 28 1.69	8.336	19 46 3.7	28.37	10 9.8
30	20 27 29.24	− 7.876	−19 47 53.6	−26.56	9 53.5
Sept. 3	20 26 58.75	7.359	19 49 35.9	24.58	9 37.3
7	20 26 30.43	6.793	19 51 10.0	22.44	9 21.1
11	20 26 4.46	6.183	19 52 35.2	20.15	9 4.9
15	20 25 41.02	5.532	19 53 51.0	17.76	8 48.8
19	20 25 20.25	− 4.846	−19 54 57.1	−15.25	8 32.8
23	20 25 2.30	4.123	19 55 53.0	12.67	8 16.8
27	20 24 47.32	3.364	19 56 38.4	10.01	8 0.8
Oct. 1	20 24 35.42	2.580	19 57 13.0	7.27	7 44.9
5	20 24 26.71	1.772	19 57 36.5	4.49	7 29.0
9	20 24 21.26	− 0.951	−19 57 48.8	− 1.65	7 13.2
13	20 24 19.12	− 0.117	19 57 49.6	+ 1.24	6 57.4
17	20 24 20.33	+ 0.722	19 57 38.9	4.11	6 41.7
21	20 24 24.90	1.563	19 57 16.7	6.98	6 26.1
25	20 24 32.84	2.409	19 56 43.0	9.87	6 10.5
29	20 24 44.17	+ 3.254	−19 55 57.8	+12.74	5 54.9
Nov. 2	20 24 58.86	4.091	19 55 1.1	15.58	5 39.5
6	20 25 16.87	4.911	19 53 53.1	18.40	5 24.0
10	20 25 38.12	5.708	19 52 34.0	21.15	5 8.6
14	20 26 2.51	6.485	19 51 4.0	23.85	4 53.3
18	20 26 29.97	+ 7.244	−19 49 23.3	+26.48	4 38.0
22	20 27 0.43	7.981	19 47 32.2	29.04	4 22.8
26	20 27 33.78	8.688	19 45 31.1	31.52	4 7.7
30	20 28 9.90	9.362	19 43 20.2	33.91	3 52.6
Dec. 4	20 28 48.64	10.000	19 40 59.9	36.21	3 37.5
8	20 29 29.84	+10.597	−19 38 30.7	+38.39	3 22.4
12	20 30 13.36	11.154	19 35 53.0	40.43	3 7.4
16	20 30 59.02	11.670	19 33 7.4	42.35	2 52.5
20	20 31 46.67	12.149	19 30 14.3	44.16	2 37.5
24	20 32 36.15	12.587	19 27 14.2	45.86	2 22.6
28	20 33 27.30	+12.979	−19 24 7.6	+47.42	2 7.7
32	20 34 19.92	+13.320	−19 20 55.1	+48.80	1 52.9

Least semidiameter,	January 24, 1″.61	Least horizontal parallax,	January 24, 0″.42
Greatest semidiameter,	July 28, 1″.78	Greatest horizontal parallax,	July 28, 0″.47

NEPTUNE, 1913.

GREENWICH MEAN TIME.

Month and Day.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.	Month and Day.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
Jan. 2	7 47 19.07	−6.882	+20 38 22.2	+18.05	12 59.1	July 1	7 47 47.67	+9.075	+20 41 0.8	−22.45	1 11.8
6	7 46 51.26	7.015	20 39 35.2	18.40	12 42.9	5	7 48 24.22	9.194	20 39 30.0	22.94	0 56.7
10	7 46 23.01	7.100	20 40 49.3	18.62	12 26.7	9	7 49 1.18	9.280	20 37 57.3	23.37	0 41.6
14	7 45 54.52	7.135	20 42 4.0	18.72	12 10.5	13	7 49 38.42	9.336	20 36 23.1	23.70	0 26.5
18	7 45 25.99	7.122	20 43 18.9	18.69	11 54.3	17	7 50 15.83	9.361	20 34 47.8	23.95	0 11.5
22	7 44 57.61	−7.064	+20 44 33.4	+18.54	11 38.1	21	7 50 53.27	+9.355	+20 33 11.6	−24.14	23 52.5
26	7 44 29.55	6.960	20 45 47.1	18.28	11 21.9	25	7 51 30.63	9.319	20 31 34.8	24.24	23 37.4
30	7 44 1.98	6.814	20 46 59.5	17.92	11 5.7	29	7 52 7.78	9.252	20 29 57.8	24.25	23 22.3
Feb. 3	7 43 35.09	6.624	20 48 10.3	17.46	10 49.6	Aug. 2	7 52 44.60	9.151	20 28 20.9	24.17	23 7.2
7	7 43 9.05	6.387	20 49 19.0	16.88	10 33.4	6	7 53 20.94	9.015	20 26 44.6	23.99	22 52.1
11	7 42 44.05	−6.107	+20 50 25.2	+16.19	10 17.2	10	7 53 56.68	+8.850	+20 25 9.2	−23.72	22 37.0
15	7 42 20.25	5.785	20 51 28.4	15.42	10 1.1	14	7 54 31.70	8.656	20 23 35.0	23.35	22 21.8
19	7 41 57.80	5.432	20 52 28.4	14.58	9 45.0	18	7 55 5.89	8.434	20 22 2.4	22.92	22 6.6
23	7 41 36.83	5.048	20 53 24.9	13.65	9 29.0	22	7 55 39.13	8.183	20 20 31.7	22.39	21 51.4
27	7 41 17.47	4.631	20 54 17.5	12.64	9 13.0	26	7 56 11.31	7.902	20 19 3.4	21.75	21 36.2
Mar. 3	7 40 59.83	−4.183	+20 55 5.9	+11.56	8 56.9	30	7 56 42.31	+7.592	+20 17 37.7	−21.05	21 21.0
7	7 40 44.03	3.707	20 55 49.9	10.45	8 40.9	Sept. 3	7 57 12.01	7.252	20 16 15.1	20.24	21 5.8
11	7 40 30.19	3.209	20 56 29.4	9.27	8 24.9	7	7 57 40.29	6.885	20 14 55.9	19.32	20 50.5
15	7 40 18.39	2.693	20 57 4.0	8.03	8 9.0	11	7 58 7.06	6.494	20 13 40.6	18.32	20 35.2
19	7 40 8.68	2.161	20 57 33.6	6.76	7 53.1	15	7 58 32.21	6.079	20 12 29.4	17.26	20 19.9
23	7 40 1.12	−1.616	+20 57 58.1	+ 5.47	7 37.3	19	7 58 55.66	+5.644	+20 11 22.6	−16.11	20 4.6
27	7 39 55.76	1.061	20 58 17.4	4.17	7 21.5	23	7 59 17.33	5.187	20 10 20.5	14.90	19 49.2
31	7 39 52.64	−0.499	20 58 31.5	2.85	7 5.8	27	7 59 37.12	4.707	20 9 23.4	13.60	19 33.8
Apr. 4	7 39 51.77	+0.070	20 58 40.2	1.49	6 50.0	Oct. 1	7 59 54.95	4.206	20 8 31.7	12.21	19 18.4
8	7 39 53.20	0.642	20 58 43.4	+ 0.12	6 34.3	5	8 0 10.74	3.688	20 7 45.7	10.77	19 2.9
12	7 39 56.91	+1.210	+20 58 41.2	− 1.25	6 18.6	9	8 0 24.44	+3.158	+20 7 5.5	− 9.31	18 47.4
16	7 40 2.87	1.771	20 58 33.5	2.61	6 3.0	13	8 0 35.99	2.617	20 6 31.2	7.80	18 31.8
20	7 40 11.06	2.324	20 58 20.3	3.96	5 47.4	17	8 0 45.36	2.065	20 6 3.1	6.22	18 16.2
24	7 40 21.45	2.869	20 58 1.8	5.29	5 31.8	21	8 0 52.50	1.502	20 5 41.4	4.61	18 0.6
28	7 40 34.00	3.405	20 57 38.0	6.61	5 16.3	25	8 0 57.37	0.934	20 5 26.2	2.99	17 45.0
May 2	7 40 48.67	+3.928	+20 57 9.0	− 7.91	5 0.8	29	8 0 59.97	+0.362	+20 5 17.5	− 1.34	17 29.3
6	7 41 5.40	4.435	20 56 34.8	9.17	4 45.4	Nov. 2	8 1 0.27	−0.210	20 5 15.5	+ 0.32	17 13.5
10	7 41 24.13	4.926	20 55 55.6	10.41	4 30.0	6	8 0 58.30	0.775	20 5 20.1	1.96	16 57.8
14	7 41 44.78	5.395	20 55 11.5	11.64	4 14.6	10	8 0 54.08	1.334	20 5 31.2	3.59	16 42.0
18	7 42 7.26	5.840	20 54 22.5	12.82	3 59.2	14	8 0 47.64	1.884	20 5 48.8	5.20	16 26.1
22	7 42 31.48	+6.264	+20 53 28.9	−13.95	3 43.9	18	8 0 39.02	−2.424	+20 6 12.8	+ 6.77	16 10.2
26	7 42 57.35	6.668	20 52 30.9	15.04	3 28.6	22	8 0 28.26	2.951	20 6 43.0	8.30	15 54.3
30	7 43 24.79	7.047	20 51 28.6	16.10	3 13.3	26	8 0 15.43	3.458	20 7 19.2	9.77	15 38.4
June 3	7 43 53.69	7.400	20 50 22.1	17.11	2 58.1	30	8 0 0.61	3.945	20 8 1.2	11.19	15 22.4
7	7 44 23.95	7.726	20 49 11.7	18.06	2 42.9	Dec. 4	7 59 43.90	4.406	20 8 48.7	12.53	15 6.4
11	7 44 55.46	+8.023	+20 47 57.6	−18.94	2 27.7	8	7 59 25.40	−4.837	+20 9 41.4	+13.78	14 50.4
15	7 45 28.10	8.291	20 46 40.2	19.76	2 12.5	12	7 59 5.24	5.236	20 10 38.9	14.94	14 34.3
19	7 46 1.75	8.532	20 45 19.5	20.54	1 57.3	16	7 58 43.55	5.604	20 11 40.8	16.00	14 18.2
23	7 46 36.31	8.744	20 43 55.9	21.24	1 42.1	20	7 58 20.45	5.939	20 12 46.7	16.95	14 2.1
27	7 47 11.66	8.925	20 42 29.6	21.89	1 26.9	24	7 57 56.09	6.234	20 13 56.2	17.79	13 46.0
July 1	7 47 47.67	+9.075	+20 41 0.8	−22.45	1 11.8	28	7 57 30.63	−6.489	+20 15 8.9	+18.51	13 29.8
5	7 48 24.22	+9.194	+20 39 30.0	−22.94	0 56.7	32	7 57 4.23	−6.701	+20 16 24.2	+19.10	13 13.7

Greatest semidiameter, January 15, 1″.33
Least semidiameter, July 18. 1″.25

Greatest horizontal parallax, January 15, 0″.30
Least horizontal parallax, July 18, 0″.28

MERCURY.

GREENWICH MEAN NOON.

Date	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Jan. 1	195 13 10.4	3 31 46.7	−11 36.2	+3 43 58.0	−21 56.9	9.614 5512	0.040 0670	0.043 6620
2	198 42 18.7	3 26 33.9	10 50.4	3 21 52.9	22 12.1	9.619 7893	0.047 1705	0.050 5940
3	202 6 25.8	3 21 44.0	9 56.4	2 59 35.6	22 21.7	9.624 7716	0.053 9338	0.057 1916
4	205 25 54.1	3 17 16.1	8 55.4	2 37 11.1	22 26.5	9.629 4931	0.060 3692	0.063 4682
5	208 41 5.1	3 13 9.2	7 48.6	2 14 44.0	22 27.1	9.633 9504	0.066 4902	0.069 4369
6	211 52 19.3	3 9 22.4	− 6 37.3	+1 52 18.2	−22 24.1	9.638 1412	0.072 3098	0.075 1104
7	214 59 56.3	3 5 54.7	5 22.6	1 29 57.0	22 17.9	9.642 0640	0.077 8402	0.080 5008
8	218 4 14.9	3 2 45.3	4 5.4	1 7 43.3	22 9.0	9.645 7181	0.083 0937	0.085 6202
9	221 5 32.9	2 59 53.4	2 46.6	0 45 39.7	21 57.8	9.649 1032	0.088 0817	0.090 4795
10	224 4 7.3	2 57 18.2	1 27.2	0 23 48.3	21 44.7	9.652 2199	0.092 8150	0.095 0895
11	227 0 14.7	2 54 59.1	− 0 8.0	+0 2 11.0	−21 29.7	9.655 0688	0.097 3041	0.099 4601
12	229 54 10.7	2 52 55.3	+ 1 10.3	−0 19 10.5	21 13.1	9.657 6505	0.101 5587	0.103 6009
13	232 46 10.4	2 51 6.4	2 27.1	0 40 14.8	20 55.2	9.659 9659	0.105 5878	0.107 5205
14	235 36 28.3	2 49 31.7	3 41.6	1 1 0.5	20 36.0	9.662 0162	0.109 4000	0.111 2272
15	238 25 18.4	2 48 10.8	4 53.3	1 21 26.4	20 15.6	9.663 8023	0.113 0029	0.114 7282
16	241 12 54.4	2 47 3.4	+ 6 1.7	−1 41 31.3	−19 54.1	9.665 3252	0.116 4039	0.118 0307
17	243 59 29.7	2 46 9.2	7 6.3	2 1 14.2	19 31.6	9.666 5858	0.119 6095	0.121 1410
18	246 45 17.1	2 45 27.7	8 6.5	2 20 34.0	19 8.0	9.667 5848	0.122 6259	0.124 0650
19	249 30 29.3	2 44 58.7	9 1.9	2 39 29.7	18 43.4	9.668 3228	0.125 4589	0.126 8081
20	252 15 18.7	2 44 42.1	9 52.2	2 58 0.3	18 17.7	9.668 8005	0.128 1131	0.129 3746
21	254 59 57.7	2 44 37.9	+10 37.0	−3 16 4.7	−17 50.9	9.669 0181	0.130 5930	0.131 7688
22	257 44 38.7	2 44 46.0	11 16.0	3 33 41.7	17 22.9	9.668 9756	0.132 9024	0.133 9942
23	260 29 33.8	2 45 6.2	11 48.7	3 50 50.1	16 53.7	9.668 6731	0.135 0447	0.136 0541
24	263 14 55.1	2 45 38.6	12 14.9	4 7 28.7	16 23.2	9.668 1103	0.137 0226	0.137 9507
25	266 0 55.0	2 46 23.3	12 34.4	4 23 36.1	15 51.3	9.667 2870	0.138 8386	0.139 6864
26	268 47 45.8	2 47 20.5	+12 46.9	−4 39 10.7	−15 17.8	9.666 2026	0.140 4943	0.141 2623
27	271 35 40.1	2 48 30.3	12 52.1	4 54 10.9	14 42.5	9.664 8563	0.141 9906	0.142 6792
28	274 24 50.7	2 49 53.0	12 49.9	5 8 34.9	14 5.3	9.663 2474	0.143 3283	0.143 9378
29	277 15 30.5	2 51 28.9	12 40.2	5 22 20.7	13 26.0	9.661 3750	0.144 5076	0.145 0378
30	280 7 52.8	2 53 18.2	12 22.8	5 35 26.1	12 44.4	9.659 2382	0.145 5282	0.145 9787
31	283 2 11.4	2 55 21.4	+11 57.6	−5 47 48.6	−12 0.2	9.656 8358	0.146 3890	0.146 7590
Feb. 1	285 58 40.3	2 57 38.9	11 24.7	5 59 25.6	11 13.2	9.654 1669	0.147 0883	0.147 3767
2	288 57 34.1	3 0 11.2	10 44.0	6 10 14.1	10 23.2	9.651 2307	0.147 6240	0.147 8298
3	291 59 7.9	3 2 58.9	9 55.6	6 20 10.8	9 29.7	9.648 0262	0.147 9937	0.148 1152
4	295 3 37.3	3 6 2.5	8 59.6	6 29 12.2	8 32.4	9.644 5530	0.148 1937	0.148 2286
5	298 11 18.5	3 9 22.6	+ 7 56.4	−6 37 14.2	− 7 30.9	9.640 8111	0.148 2193	0.148 1654
6	301 22 28.3	3 12 59.9	6 46.2	6 44 12.5	6 25.0	9.636 8007	0.148 0662	0.147 9209
7	304 37 24.2	3 16 55.1	5 29.6	6 50 2.5	5 14.1	9.632 5227	0.147 7286	0.147 4886
8	307 56 24.6	3 21 8.8	4 7.0	6 54 38.8	3 57.7	9.627 9788	0.147 1998	0.146 8614
9	311 19 48.3	3 25 41.9	2 39.2	6 57 55.8	2 35.4	9.623 1717	0.146 4723	0.146 0313
10	314 47 55.0	3 30 34.9	+ 1 7.1	−6 59 47.4	− 1 6.7	9.618 1052	0.145 5374	0.144 9894
11	318 21 5.0	3 35 48.6	− 0 28.2	7 0 7.0	+ 0 28.7	9.612 7848	0.144 3859	0.143 7257
12	321 59 39.3	3 41 23.6	2 5.5	6 58 47.5	2 11.5	9.607 2177	0.143 0071	0.142 2286
13	325 43 59.4	3 47 20.5	3 43.2	6 55 41.4	4 2.1	9.601 4133	0.141 3885	0.140 4854
14	329 34 27.5	3 53 39.6	5 19.7	6 50 40.6	6 0.9	9.595 3838	0.139 5175	0.138 4829
15	333 31 26.0	4 0 21.2	− 6 53.0	−6 43 36.8	+ 8 8.1	9.589 1442	0.137 3797	0.136 2059
16	337 35 17.4	4 7 25.3	− 8 20.9	−6 34 21.5	+10 24.0	9.582 7132	0.134 9592	0.133 6376

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Feb. 15	333 31 26.0	4 0 21.2	− 6 53.0	−6 43 36.8	+ 8 8.1	9.589 1442	0.137 3797	0.136 2059
16	337 35 17.4	4 7 25.3	8 20.9	6 34 21.5	10 24.0	9.582 7132	0.134 9592	0.133 6376
17	341 46 24.1	4 14 51.6	9 40.9	6 22 46.0	12 48.5	9.576 1137	0.132 2388	0.130 7604
18	346 5 8.0	4 22 39.5	10 50.5	6 8 41.7	15 21.5	9.569 3733	0.129 2000	0.127 5550
19	350 31 50.2	4 30 47.9	11 47.0	5 52 0.4	18 2.4	9.562 5252	0.125 8227	0.124 0006
20	355 6 50.2	4 39 15.0	−12 27.5	−5 32 34.8	+20 50.1	9.555 6084	0.122 0857	0.120 0753
21	359 50 25.4	4 47 58.1	12 49.2	5 10 18.5	23 43.3	9.548 6684	0.117 9664	0.115 7560
22	4 42 50.5	4 56 54.1	12 49.7	4 45 7.0	26 40.1	9.541 7579	0.113 4411	0.111 0186
23	9 44 16.4	5 5 58.9	12 27.1	4 16 58.1	29 37.7	9.534 9367	0.108 4855	0.105 8387
24	14 54 49.2	5 15 7.1	11 39.7	3 45 52.5	32 32.8	9.528 2720	0.103 0751	0.100 1916
25	20 14 29.3	5 24 12.3	−10 27.0	−3 11 54.8	+35 21.2	9.521 8378	0.097 1852	0.094 0530
26	25 43 10.1	5 33 7.0	8 49.7	2 35 13.8	37 58.4	9.515 7142	0.090 7921	0.087 3999
27	31 20 36.9	5 41 42.7	6 49.5	1 56 3.6	40 18.8	9.509 9861	0.083 8739	0.080 2117
28	37 6 26.0	5 49 50.0	4 30.0	1 14 43.9	42 16.5	9.504 7410	0.076 4110	0.072 4699
Mar. 1	43 0 3.9	5 57 18.4	− 1 55.9	−0 31 40.1	43 45.8	9.500 0665	0.068 3869	0.064 1608
2	49 0 46.3	6 3 57.3	+ 0 46.3	+0 12 36.5	+44 41.2	9.496 0471	0.059 7905	0.055 2756
3	55 7 38.5	6 9 36.2	3 29.1	0 57 29.5	44 58.0	9.492 7605	0.050 6160	0.045 8121
4	61 19 35.5	6 14 5.2	6 4.4	1 42 18.4	44 32.6	9.490 2740	0.040 8646	0.035 7748
5	67 35 22.9	6 17 15.6	8 23.8	2 26 20.1	43 23.3	9.488 6407	0.030 5447	0.025 1767
6	73 53 38.4	6 19 0.7	10 19.7	3 8 50.5	41 30.4	9.487 8968	0.019 6739	0.014 0398
7	80 12 54.5	6 19 16.1	+11 45.7	+3 49 7.1	+38 56.3	9.488 0588	0.008 2788	0.002 3956
8	86 31 40.5	6 18 0.5	12 37.2	4 26 30.8	35 45.3	9.489 1231	9.996 3955	9.990 2845
9	92 48 25.8	6 15 15.2	12 52.0	5 0 27.5	32 3.6	9.491 0660	9.984 0693	9.977 7570
10	99 1 42.7	6 11 4.7	12 30.3	5 30 30.2	27 58.6	9.493 8450	9.971 3554	9.964 8730
11	105 10 9.3	6 5 36.0	11 34.5	5 56 19.3	23 37.9	9.497 4016	9.958 3186	9.951 7014
12	111 12 31.8	5 58 58.3	+10 8.7	+6 17 43.4	+19 9.7	9.501 6641	9.945 0314	9.938 3189
13	117 7 46.6	5 51 22.3	8 18.5	6 34 38.7	14 41.5	9.506 5521	9.931 5746	9.924 8098
14	122 55 0.9	5 42 59.3	6 10.4	6 47 8.3	10 19.4	9.511 9797	9.918 0364	9.911 2664
15	128 33 33.7	5 34 1.1	3 51.2	6 55 21.2	6 8.8	9.517 8589	9.904 5123	9.897 7868
16	134 2 55.3	5 24 38.9	+ 1 27.2	6 59 31.1	+ 2 13.9	9.524 1030	9.891 1029	9.884 4741
17	139 22 46.9	5 15 2.9	− 0 55.7	+6 59 54.9	− 1 22.9	9.530 6285	9.877 9142	9.871 4368
18	144 32 59.4	5 5 22.1	3 12.6	6 56 51.8	4 39.8	9.537 3573	9.865 0560	9.858 7857
19	149 33 32.2	4 55 44.6	5 19.3	6 50 42.1	7 36.2	9.544 2178	9.852 6401	9.846 6333
20	154 24 31.9	4 46 16.8	7 12.9	6 41 46.3	10 12.2	9.551 1454	9.840 7792	9.835 0917
21	159 6 10.8	4 37 4.0	8 51.2	6 30 24.3	12 28.7	9.558 0828	9.829 5843	9.824 2704
22	163 38 46.1	4 28 10.1	−10 12.9	+6 16 55.2	−14 26.6	9.564 9800	9.819 1626	9.814 2732
23	168 2 38.3	4 19 38.1	11 17.4	6 1 36.9	16 7.4	9.571 7938	9.809 6138	9.805 1953
24	172 18 10.3	4 11 30.0	12 4.8	5 44 45.6	17 32.6	9.578 4875	9.801 0279	9.797 1206
25	176 25 46.6	4 3 47.0	12 35.6	5 26 36.4	18 43.6	9.585 0299	9.793 4817	9.790 1185
26	180 25 52.8	3 56 29.7	12 50.5	5 7 22.6	19 42.1	9.591 3951	9.787 0369	9.784 2420
27	184 18 54.6	3 49 38.3	−12 50.5	+4 47 15.9	−20 29.5	9.597 5618	9.781 7375	9.779 5256
28	188 5 18.1	3 43 12.9	12 37.1	4 26 26.9	21 7.0	9.603 5126	9.777 6076	9.775 9834
29	191 45 28.8	3 37 12.6	12 11.4	4 5 4.8	21 36.0	9.609 2335	9.774 6517	9.773 6102
30	195 19 51.5	3 31 36.8	11 34.9	3 43 17.5	21 57.6	9.614 7136	9.772 8552	9.772 3821
31	198 48 50.3	3 26 24.8	10 48.8	3 21 11.9	22 12.7	9.619 9442	9.772 1853	9.772 2582
Apr. 1	202 12 48.7	3 21 35.7	− 9 54.5	+2 58 54.2	−22 22.0	9.624 9187	9.772 5935	9.773 1828
2	205 32 8.9	3 17 8.4	− 8 53.3	+2 36 29.6	−22 26.5	9.629 6323	9.774 0173	9.775 0877

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude. Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Apr. 1	202 12 48.7	3 21 35.7	− 9 54.5	+2 58 54.2	−22 22.0	9.624 9187	9.772 5935	9.773 1828
2	205 32 8.9	3 17 8.4	8 53.3	2 36 29.6	22 26.5	9.629 6323	9.774 0173	9.775 0877
3	208 47 12.4	3 13 2.1	7 46.5	2 14 2.5	22 27.0	9.634 0817	9.776 3843	9.777 8970
4	211 58 19.7	3 9 15.8	6 35.1	1 51 36.7	22 23.9	9.638 2644	9.779 6153	9.781 5290
5	215 5 50.4	3 5 48.7	5 20.2	1 29 15.7	22 17.6	9.642 1790	9.783 6276	9.785 9004
6	218 10 3.1	3 2 39.9	− 4 3.0	+1 7 2.4	−22 8.7	9.645 8250	9.788 3370	9.790 9270
7	221 11 15.8	2 59 48.5	2 44.2	0 44 59.1	21 57.5	9.649 2022	9.793 6603	9.796 5270
8	224 9 45.6	2 57 13.8	1 24.8	0 23 8.1	21 44.2	9.652 3109	9.799 5175	9.802 6225
9	227 5 48.8	2 54 55.1	− 0 5.6	+0 1 31.3	21 29.2	9.655 1516	9.805 8330	9.809 1404
10	229 59 41.0	2 52 51.7	+ 1 12.7	−0 19 49.7	21 12.6	9.657 7252	9.812 5367	9.816 0139
11	232 51 37.3	2 51 3.2	+ 2 29.4	−0 40 53.5	−20 54.6	9.660 0327	9.819 5645	9.823 1816
12	235 41 52.2	2 49 29.0	3 43.9	1 1 38.6	20 35.4	9.662 0750	9.826 8585	9.830 5888
13	238 30 39.9	2 48 8.6	4 55.5	1 22 3.8	20 14.9	9.663 8531	9.834 3667	9.838 1866
14	241 18 13.9	2 47 1.6	6 3.8	1 42 8.1	19 53.4	9.665 3681	9.842 0434	9.845 9320
15	244 4 47.4	2 46 7.7	7 8.2	2 1 50.3	19 30.9	9.666 6208	9.849 8480	9.853 7872
16	246 50 33.5	2 45 26.5	+ 8 8.3	−2 21 9.4	−19 7.3	9.667 6119	9.857 7457	9.861 7198
17	249 35 44.7	2 44 57.9	9 3.6	2 40 4.4	18 42.6	9.668 3421	9.865 7061	9.869 7015
18	252 20 33.6	2 44 41.8	9 53.7	2 58 34.2	18 16.9	9.668 8119	9.873 7032	9.877 7084
19	255 5 12.5	2 44 38.0	10 38.3	3 16 37.7	17 50.0	9.669 0215	9.881 7147	9.885 7198
20	257 49 53.6	2 44 46.4	11 17.0	3 34 13.8	17 22.0	9.668 9710	9.889 7215	9.893 7180
21	260 34 49.2	2 45 6.9	+11 49.6	−3 51 21.3	−16 52.8	9.668 6604	9.897 7076	9.901 6886
22	263 20 11.5	2 45 39.6	12 15.6	4 7 58.9	16 22.2	9.668 0898	9.905 6595	9.909 6189
23	266 6 12.6	2 46 24.7	12 34.9	4 24 5.3	15 50.2	9.667 2587	9.913 5655	9.917 4983
24	268 53 5.1	2 47 22.4	12 47.2	4 39 38.9	15 16.6	9.666 1662	9.921 4162	9.925 3183
25	271 41 1.5	2 48 32.6	12 52.2	4 54 38.0	14 41.3	9.664 8118	9.929 2039	9.933 0720
26	274 30 14.6	2 49 55.6	+12 49.7	−5 9 0.9	−14 4.1	9.663 1948	9.936 9219	9.940 7529
27	277 20 57.2	2 51 31.8	12 39.7	5 22 45.5	13 24.8	9.661 3144	9.944 5645	9.948 3561
28	280 13 22.8	2 53 21.6	12 22.1	5 35 49.6	12 43.1	9.659 1694	9.952 1272	9.955 8775
29	283 7 45.1	2 55 25.3	11 56.7	5 48 10.8	11 58.9	9.656 7588	9.959 6064	9.963 3135
30	286 4 18.1	2 57 43.3	11 23.5	5 59 46.3	11 11.8	9.654 0817	9.966 9984	9.970 6608
May 1	289 3 16.6	3 0 16.1	+10 42.6	−6 10 33.2	−10 21.6	9.651 1372	9.974 3004	9.977 9168
2	292 4 55.5	3 3 4.2	9 54.0	6 20 28.3	9 28.0	9.647 9243	9.981 5095	9.985 0783
3	295 9 30.4	3 6 8.3	8 57.8	6 29 27.9	8 30.6	9.644 4428	9.988 6230	9.992 1433
4	298 17 17.6	3 9 28.9	7 54.3	6 37 28.0	7 29.0	9.640 6925	9.995 6387	9.999 1088
5	301 28 34.0	3 13 6.8	6 44.0	6 44 24.3	6 22.9	9.636 6737	0.002 5534	0.005 9719
6	304 43 37.1	3 17 2.5	+ 5 27.2	−6 50 12.1	− 5 11.8	9.632 3874	0.009 3640	0.012 7293
7	308 2 45.2	3 21 16.8	4 4.4	6 54 46.0	3 55.2	9.627 8352	0.016 0673	0.019 3776
8	311 26 17.3	3 25 50.5	2 36.4	6 58 0.5	2 32.8	9.623 0199	0.022 6595	0.025 9125
9	314 54 33.0	3 30 44.1	+ 1 4.2	6 59 49.5	− 1 3.9	9.617 9455	0.029 1360	0.032 3295
10	318 27 52.5	3 35 58.4	− 0 31.2	7 0 6.2	+ 0 31.8	9.612 6173	0.035 4922	0.038 6233
11	322 6 37.0	3 41 34.2	− 2 8.5	−6 58 43.5	+ 2 14.8	9.607 0425	0.041 7220	0.044 7876
12	325 51 8.2	3 47 31.7	3 46.2	6 55 33.9	4 5.6	9.601 2308	0.047 8191	0.050 8155
13	329 41 47.9	3 53 51.5	5 22.6	6 50 29.5	6 4.7	9.595 1944	0.053 7757	0.056 6987
14	333 38 58.7	4 0 33.8	6 55.8	6 43 21.8	8 12.2	9.588 9485	0.059 5834	0.062 4283
15	337 43 3.1	4 7 38.7	8 23.5	6 34 2.3	10 28.3	9.582 5117	0.065 2321	0.067 9935
16	341 54 23.6	4 15 5.8	− 9 43.2	−6 22 22.4	+12 53.1	9.575 9071	0.070 7109	0.073 3827
17	346 13 22.0	4 22 54.4	−10 52.5	−6 8 13.3	+15 26.4	9.569 1625	0.076 0073	0.078 5828

MERCURY.

GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
								At Date.	At Intermediate Date.
		° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
May	17	346 13 22.0	4 22 54.4	−10 52.5	−6 8 13.3	+15 26.4	9.569 1625	0.076 0073	0.078 5828
	18	350 40 19.3	4 31 3.4	11 48.5	5 51 27.1	18 7.4	9.562 3113	0.081 1074	0.083 5790
	19	355 15 35.0	4 39 31.0	12 28.4	5 31 56.3	20 55.3	9.555 3927	0.085 9956	0.088 3551
	20	359 59 26.5	4 48 14.5	12 49.5	5 9 34.7	23 48.6	9.548 4525	0.090 6552	0.092 8936
	21	4 52 8.3	4 57 10.9	12 49.4	4 44 17.8	26 45.4	9.541 5434	0.095 0677	0.097 1751
	22	9 53 51.1	5 6 15.9	−12 26.0	−4 16 3.4	+29 43.1	9.534 7255	0.099 2133	0.101 1795
	23	15 4 41.0	5 15 24.1	11 37.8	3 44 52.5	32 38.2	9.528 0663	0.103 0710	0.104 8851
	24	20 24 38.2	5 24 29.1	10 24.4	3 10 49.5	35 26.5	9.521 6401	0.106 6188	0.108 2693
	25	25 53 35.7	5 33 23.4	8 46.3	2 34 3.6	38 3.1	9.515 5271	0.109 8337	0.111 3091
	26	31 31 18.7	5 41 58.5	6 45.5	1 54 49.1	40 22.8	9.509 8123	0.112 6927	0.113 9816
	27	37 17 23.2	5 50 4.8	− 4 25.4	−1 13 25.7	+42 19.8	9.504 5833	0.115 1730	0.116 2642
	28	43 11 15.3	5 57 31.9	− 1 51.0	−0 30 19.1	43 48.2	9.499 9274	0.117 2525	0.118 1355
	29	49 12 10.5	6 4 9.2	+ 0 51.3	+0 13 59.3	44 42.4	9.495 9292	0.118 9109	0.119 5764
	30	55 19 13.6	6 9 46.1	3 34.0	0 58 52.8	44 57.9	9.492 6662	0.120 1299	0.120 5697
	31	61 31 19.3	6 14 12.8	6 8.9	1 43 40.9	44 31.1	9.490 2052	0.120 8941	0.121 1019
June	1	67 47 13.0	6 17 20.7	+ 8 27.7	+2 27 40.5	+43 20.5	9.488 5989	0.121 1919	0.121 1633
	2	74 5 32.2	6 19 3.1	10 22.8	3 10 7.5	41 26.3	9.487 8828	0.121 0156	0.120 7487
	3	80 24 49.3	6 19 15.7	11 47.8	3 50 19.4	38 50.9	9.488 0729	0.120 3626	0.119 8575
	4	86 43 33.4	6 17 57.2	12 38.2	4 27 37.2	35 38.8	9.489 1650	0.119 2342	0.118 4935
	5	93 0 14.0	6 15 9.2	12 51.9	5 1 27.1	31 56.4	9.491 1346	0.117 6366	0.116 6651
	6	99 13 23.6	6 10 56.1	+12 29.1	+5 31 22.2	+27 50.7	9.493 9388	0.115 5807	0.114 3852
	7	105 21 40.4	6 5 25.1	11 32.2	5 57 3.2	23 29.7	9.497 5185	0.113 0807	0.111 6696
	8	111 23 51.0	5 58 45.5	10 5.6	6 18 19.0	19 1.4	9.501 8019	0.110 1544	0.108 5378
	9	117 18 52.0	5 51 7.8	8 14.8	6 35 6.0	14 33.2	9.506 7084	0.106 8223	0.105 0107
	10	123 5 51.0	5 42 43.6	6 6.3	6 47 27.4	10 11.4	9.512 1518	0.103 1061	0.101 1114
	11	128 44 7.4	5 33 44.4	+ 3 46.8	+6 55 32.5	+ 6 1.2	9.518 0440	0.099 0294	0.096 8632
	12	134 13 11.9	5 24 21.5	+ 1 22.7	6 59 35.1	+ 2 6.7	9.524 2983	0.094 6157	0.092 2898
	13	139 32 45.9	5 14 45.1	− 1 0.1	6 59 52.2	− 1 29.4	9.530 8316	0.089 8885	0.087 4147
	14	144 42 40.5	5 5 4.3	3 16.7	6 56 43.0	4 45.6	9.537 5658	0.084 8710	0.082 2603
	15	149 42 55.5	4 55 26.9	5 23.1	6 50 27.9	7 41.3	9.544 4295	0.079 5852	0.076 8483
	16	154 33 37.6	4 45 59.5	− 7 16.2	+6 41 27.2	−10 16.8	9.551 3585	0.074 0520	0.071 1988
	17	159 14 59.5	4 36 47.3	8 54.0	6 30 0.9	12 32.7	9.558 2959	0.068 2910	0.065 3308
	18	163 47 18.4	4 27 54.0	10 15.1	6 16 28.1	14 30.1	9.565 1916	0.062 3204	0.059 2619
	19	168 10 54.7	4 19 22.6	11 19.1	6 1 6.6	16 10.3	9.572 0025	0.056 1570	0.053 0076
	20	172 26 11.5	4 11 15.2	12 6.0	5 44 12.8	17 35.0	9.578 6921	0.049 8155	0.046 5825
	21	176 33 33.5	4 3 33.0	−12 36.3	+5 26 1.4	−18 45.7	9.585 2296	0.043 3101	0.039 9999
	22	180 33 26.1	3 56 16.5	12 50.7	5 6 45.7	19 43.8	9.591 5891	0.036 6532	0.033 2714
	23	184 26 15.2	3 49 26.0	12 50.3	4 46 37.5	20 30.8	9.597 7495	0.029 8557	0.026 4073
	24	188 12 26.7	3 43 1.3	12 36.4	4 25 47.3	21 8.0	9.603 6935	0.022 9276	0.019 4176
	25	191 52 26.2	3 37 1.7	12 10.4	4 4 24.3	21 36.7	9.609 4073	0.015 8784	0.012 3109
	26	195 26 38.4	3 31 26.7	−11 33.5	+3 42 36.3	−21 58.0	9.614 8799	0.008 7160	0.005 0947
	27	198 55 27.5	3 26 15.4	10 47.2	3 20 30.3	22 12.9	9.620 1027	0.001 4478	9.997 7760
	28	202 19 16.8	3 21 27.0	9 52.7	2 58 12.3	22 22.2	9.625 0691	9.994 0802	9.990 3613
	29	205 38 28.7	3 17 0.4	8 51.3	2 35 47.5	22 26.7	9.629 7746	9.986 6200	9.982 8569
	30	208 53 24.5	3 12 54.7	7 44.3	2 13 20.4	22 27.0	9.634 2157	9.979 0728	9.975 2682
July	1	212 4 24.7	3 9 9.0	− 6 32.8	+1 50 54.7	−22 23.7	9.638 3901	9.971 4439	9.967 6005
	2	215 11 49.0	3 5 42.4	− 5 17.8	+1 28 33.9	−22 17.4	9.642 2965	9.963 7388	9.959 8595

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
July 1	212 4 24.7	3 9 9.0	− 6 32.8	+1 50 54.7	−22 23.7	9.638 3901	9.971 4439	9.967 6005
2	215 11 49.0	3 5 42.4	5 17.8	1 28 33.9	22 17.4	9.642 2965	9.963 7388	9.959 8595
3	218 15 55.9	3 2 34.1	4 0.5	1 6 20.8	22 8.4	9.645 9342	9.955 9632	9.952 0506
4	221 17 3.3	2 59 43.3	2 41.7	0 44 17.9	21 57.1	9.649 3030	9.948 1225	9.944 1795
5	224 15 28.2	2 57 9.1	1 22.3	0 22 27.4	21 43.8	9.652 4033	9.940 2225	9.936 2524
6	227 11 27.0	2 54 50.9	− 0 3.1	+0 0 51.0	−21 28.8	9.655 2357	9.932 2700	9.928 2762
7	230 5 15.3	2 52 48.1	+ 1 15.1	−0 20 29.5	21 12.1	9.657 8010	9.924 2719	9.920 2583
8	232 57 8.2	2 51 0.0	2 31.8	0 41 32.7	20 54.0	9.660 1002	9.916 2365	9.912 2077
9	235 47 20.2	2 49 26.3	3 46.2	1 2 17.2	20 34.8	9.662 1343	9.908 1730	9.904 1339
10	238 36 5.4	2 48 6.3	4 57.7	1 22 41.8	20 14.3	9.663 9043	9.900 0917	9.896 0482
11	241 23 37.3	2 46 59.7	+ 6 5.9	−1 42 45.4	−19 52.7	9.665 4112	9.892 0050	9.887 9638
12	244 10 9.2	2 46 6.2	7 10.1	2 2 26.9	19 30.1	9.666 6557	9.883 9265	9.879 8953
13	246 55 53.9	2 45 25.4	8 10.0	2 21 45.3	19 6.4	9.667 6386	9.875 8725	9.871 8604
14	249 41 4.2	2 44 57.2	9 5.2	2 40 39.4	18 41.7	9.668 3606	9.867 8615	9.863 8785
15	252 25 52.6	2 44 41.5	9 55.2	2 59 8.4	18 16.0	9.668 8222	9.859 9145	9.855 9726
16	255 10 31.4	2 44 38.1	+10 39.6	−3 17 11.1	−17 49.2	9.669 0237	9.852 0558	9.848 1677
17	257 55 12.8	2 44 46.8	11 18.2	3 34 46.3	17 21.1	9.668 9652	9.844 3123	9.840 4937
18	260 40 9.0	2 45 7.7	11 50.5	3 51 52.9	16 51.9	9.668 6466	9.836 7160	9.832 9837
19	263 25 32.3	2 45 40.8	12 16.3	4 8 29.6	16 21.3	9.668 0677	9.829 3016	9.825 6747
20	266 11 34.9	2 46 26.3	12 35.4	4 24 35.0	15 49.3	9.667 2283	9.822 1084	9.818 6083
21	268 58 29.2	2 47 24.3	+12 47.4	−4 40 7.5	−15 15.6	9.666 1277	9.815 1804	9.811 8307
22	271 46 27.7	2 48 35.0	12 52.2	4 55 5.6	14 40.2	9.664 7652	9.808 5657	9.805 3920
23	274 35 43.3	2 49 58.5	12 49.5	5 9 27.3	14 2.8	9.663 1400	9.802 3167	9.799 3470
24	277 26 29 0	2 51 35.1	12 39.3	5 23 10.6	13 23.4	9.661 2512	9.796 4904	9.793 7546
25	280 18 58.1	2 53 25.3	12 21.4	5 36 13.4	12 41.7	9.659 0980	9.791 1476	9.788 6773
26	283 13 24.2	2 55 29.4	+11 55.8	−5 48 33.2	−11 57.4	9.656 6791	9.786 3520	9.784 1800
27	286 10 1.6	2 57 47.8	11 22.4	6 0 7.3	11 10.2	9.653 9937	9.782 1696	9.780 3291
28	289 9 4.8	3 0 21.0	10 41.2	6 10 52.7	10 19.9	9.651 0409	9.778 6671	9.777 1918
29	292 10 48.9	3 3 9.7	9 52.3	6 20 46.0	9 26.2	9.647 8198	9.775 9113	9.774 8334
30	295 15 29.6	3 6 14.3	8 55.9	6 29 43.8	8 28.7	9.644 3300	9.773 9658	9.773 3158
31	298 23 23.1	3 9 35.5	+ 7 52.3	−6 37 42.0	− 7 27.0	9.640 5714	9.772 8902	9.772 6954
Aug. 1	301 34 46.4	3 13 13.9	6 41.7	6 44 36.3	6 20.7	9.636 5443	9.772 7375	9.773 0217
2	304 49 56.9	3 17 10.2	5 24.6	6 50 21.8	5 9.5	9.632 2497	9.773 5525	9.774 3338
3	308 9 12.9	3 21 25.1	4 1.7	6 54 53.4	3 52.8	9.627 6893	9.775 3688	9.776 6600
4	311 32 53.5	3 25 59.4	2 33.6	6 58 5.3	2 30.1	9.622 8658	9.778 2090	9.780 0162
5	315 1 18.3	3 30 53.7	+ 1 1.3	−6 59 51.4	− 1 1.1	9.617 7833	9.782 0813	9.784 4032
6	318 34 47.7	3 36 8.7	− 0 34.2	7 0 5.1	+ 0 34.8	9.612 4473	9.786 9799	9.789 8087
7	322 13 42.7	3 41 45.1	2 11.6	6 58 39.3	2 18.1	9.606 8651	9.792 8857	9.796 2064
8	325 58 25.0	3 47 43.3	3 49.3	6 55 26.3	4 9.2	9.601 0463	9.799 7654	9.803 5564
9	329 49 16.6	3 54 3.8	5 25.6	6 50 18.1	6 8.5	9.595 0031	9.807 5724	9.811 8061
10	333 46 39.9	4 0 46.8	− 6 58.6	−6 43 6.4	+ 8 16.3	9.588 7509	9.816 2492	9.820 8930
11	337 50 57.6	4 7 52.3	8 26.1	6 33 42.7	10 32.7	9.582 3085	9.825 7285	9.830 7461
12	342 2 32.0	4 15 20.1	9 45.6	6 21 58.2	12 57.8	9.575 6992	9.835 9357	9.841 2871
13	346 21 45.0	4 23 9.3	10 54.4	6 7 44.4	15 31.3	9.568 9509	9.846 7898	9.852 4331
14	350 48 57.5	4 31 18.9	11 50.0	5 50 53.1	18 12.6	9.562 0971	9.858 2062	9.864 0982
15	355 24 28.9	4 39 47.0	−12 29.4	−5 31 17.1	+21 0.7	9.555 1772	9.870 0983	9.876 1954
16	0 8 36.6	4 48 31.0	−12 49.9	−5 8 50.1	+23 54.2	9.548 2371	9.882 3785	9.888 6367

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Aug. 16	0 8 36.6	4 48 31.0	−12 49.9	−5 8 50.1	+23 54.2	9.548 2371	9.882 3785	9.888 6367
17	5 1 35.1	4 57 27.7	12 49.0	4 43 27.6	26 51.1	9.541 3299	9.894 9593	9.901 3356
18	10 3 34.9	5 6 32.8	12 24.8	4 15 7.7	29 48.7	9.534 5161	9.907 7551	9.914 2072
19	15 14 41.8	5 15 41.0	11 35.9	3 43 51.3	32 43.5	9.527 8633	9.920 6819	9.927 1690
20	20 34 55.8	5 24 45.8	10 21.7	3 9 43.1	35 31.5	9.521 4458	9.933 6585	9.940 1408
21	26 4 9.8	5 33 39.7	− 8 42.9	−2 32 52.4	+38 7.7	9.515 3440	9.946 6065	9.953 0463
22	31 42 8.8	5 42 14.1	6 41.4	1 53 33.5	40 26.7	9.509 6431	9.959 4512	9.965 8125
23	37 28 28.3	5 50 19.3	4 20.8	1 12 6.5	42 22.9	9.504 4306	9.972 1217	9.978 3707
24	43 22 34.1	5 57 45.0	− 1 46.0	−0 28 57.2	43 50.4	9.499 7943	9.984 5515	9.990 6565
25	49 23 41.5	6 4 20.5	+ 0 56.4	+0 15 22.8	44 43.5	9.495 8181	9.996 6784	0.002 6103
26	55 30 54.9	6 9 55.3	+ 3 39.0	+1 0 16.8	+44 57.7	9.492 5790	0.008 4458	0.014 1787
27	61 43 8.7	6 14 19.7	6 13.5	1 45 4.1	44 29.6	9.490 1439	0.019 8033	0.025 3144
28	67 59 8.0	6 17 25.0	8 31.7	2 29 1.4	43 17.6	9.488 5649	0.030 7070	0.035 9768
29	74 17 30.3	6 19 4.6	10 25.9	3 11 24.8	41 21.9	9.487 8767	0.041 1197	0.046 1324
30	80 36 47.4	6 19 14.5	11 49.9	3 51 31.8	38 45.4	9.488 0952	0.051 0119	0.055 7557
31	86 55 28.9	6 17 53.3	+12 39.2	+4 28 43.6	+35 32.4	9.489 2150	0.060 3619	0.064 8289
Sept. 1	93 12 4.2	6 15 2.5	12 51.7	5 2 26.6	31 49.0	9.491 2113	0.069 1556	0.073 3414
2	99 25 5.7	6 10 46.8	12 27.8	5 32 14.0	27 42.7	9.494 0406	0.077 3861	0.081 2898
3	105 33 11.9	6 5 13.6	11 30.0	5 57 46.9	23 21.4	9.497 6433	0.085 0532	0.088 6773
4	111 35 10.0	5 58 32.0	10 2.5	6 18 54.4	18 53.1	9.501 9473	0.092 1633	0.095 5129
5	117 29 56.5	6 50 52.7	+ 8 11.0	+6 35 33.0	+14 24.9	9.506 8716	0.098 7279	0.101 8103
6	123 16 39.8	5 42 27.2	6 2.0	6 47 46.3	10 3.3	9.512 3300	0.104 7624	0.107 5867
7	128 54 39.3	5 33 27.1	3 42.3	6 55 43.6	5 53.7	9.518 2346	0.110 2859	0.112 8627
8	134 23 26.1	5 24 3.6	+ 1 18.2	6 59 38.9	+ 1 59.8	9.524 4987	0.115 3200	0.117 6607
9	139 42 42.1	5 14 26.9	− 1 4.5	6 59 49.3	− 1 35.7	9.531 0392	0.119 8877	0.122 0040
10	144 52 18.6	5 4 46.1	− 3 20.8	+6 56 34.1	− 4 51.3	9.537 7784	0.124 0127	0.125 9168
11	149 52 15.6	4 55 9.0	5 26.8	6 50 13.5	7 46.5	9.544 6451	0.127 7192	0.129 4230
12	154 42 40.1	4 45 42.0	7 19.5	6 41 7.9	10 21.3	9.551 5751	0.131 0310	0.132 5461
13	159 23 44.9	4 36 30.2	8 56.7	6 29 37.5	12 36.5	9.558 5116	0.133 9711	0.135 3088
14	163 55 47.1	4 27 37.6	10 17.4	6 16 1.1	14 33.3	9.565 4050	0.136 5617	0.137 7325
15	168 19 7.5	4 19 7.1	−11 20.8	+6 0 36.5	−16 13.1	9.572 2126	0.138 8236	0.139 8375
16	172 34 9.3	4 11 0.5	12 7.2	5 43 40.0	17 37.4	9.578 8978	0.140 7764	0.141 6426
17	176 41 17.0	4 3 19.0	12 36.9	5 25 26.4	18 47.7	9.585 4300	0.142 4383	0.143 1655
18	180 40 56.0	3 56 3.4	12 50.8	5 6 8.9	19 45.5	9.591 7836	0.143 8261	0.144 4221
19	184 33 32.4	3 49 13.8	12 50.0	4 45 59.3	20 32.1	9.597 9373	0.144 9552	0.145 4272
20	188 19 32.1	3 42 49.8	−12 35.8	+4 25 8.0	−21 9.1	9.603 8742	0.145 8396	0.146 1940
21	191 59 20.4	3 36 51.0	12 9.4	4 3 44.0	21 37.6	9.609 5806	0.146 4919	0.146 7346
22	195 33 22.3	3 31 16.7	11 32.2	3 41 55.4	21 58.6	9.615 0454	0.146 9235	0.147 0597
23	199 2 1.8	3 26 6.1	10 45.6	3 19 48.9	22 13.2	9.620 2602	0.147 1446	0.147 1792
24	202 25 42.2	3 21 18.3	9 50.9	2 57 30.6	22 22.4	9.625 2186	0.147 1644	0.147 1012
25	205 44 45.8	3 16 52.5	− 8 49.3	+2 35 5.7	−22 26.8	9.629 9159	0.146 9906	0.146 8334
26	208 59 34.1	3 12 47.5	7 42.1	2 12 38.6	22 27.0	9.634 3487	0.146 6304	0.146 3822
27	212 10 27.4	3 9 2.4	6 30.5	1 50 13.0	22 23.6	9.638 5147	0.146 0896	0.145 7532
28	215 17 45.3	3 5 36.5	5 15.5	1 27 52.4	22 17.1	9.642 4126	0.145 3736	0.144 9512
29	218 21 46.4	3 2 28.7	3 58.1	1 5 39.6	22 8.1	9.646 0419	0.144 4866	0.143 9803
30	221 22 48.5	2 59 38.3	− 2 39.3	+0 43 37.0	−21 56.8	9.649 4024	0.143 4326	0.142 8437
Oct. 1	224 21 8.7	2 57 4.7	− 1 19.9	+0 21 46.8	−21 43.4	9.652 4944	0.142 2140	0.141 5438

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Oct. 1	224 21 8.7	2 57 4.7	− 1 19.9	+0 21 46.8	−21 43.4	9.652 4944	0.142 2140	0.141 5438
2	227 17 3.3	2 54 47.0	− 0 0.7	+0 0 10.9	21 28.3	9.655 3185	0.140 8332	0.140 0525
3	230 10 47.9	2 52 44.7	+ 1 17.6	−0 21 9.1	21 11.6	9.657 8755	0.139 2919	0.138 4614
4	233 2 37.5	2 50 57.0	2 34.1	0 42 11.7	20 53.5	9.660 1663	0.137 5912	0.136 6813
5	235 52 46.7	2 49 23.7	3 48.4	1 2 55.6	20 34.2	9.662 1922	0.135 7317	0.134 7423
6	238 41 29.5	2 48 4.1	+ 4 59.9	−1 23 19.6	−20 13.7	9.663 9541	0.133 7130	0.132 6438
7	241 28 59.4	2 46 57.8	6 7.9	1 43 22.5	19 52.0	9.665 4528	0.131 5347	0.130 3854
8	244 15 29.6	2 46 4.8	7 12.1	2 3 3.3	19 29.3	9.666 6892	0.129 1956	0.127 9653
9	247 1 13.1	2 45 24.5	8 11.9	2 22 20.9	19 5.7	9.667 6640	0.126 6941	0.125 3818
10	249 46 22.7	2 44 56.7	9 6.9	2 41 14.4	18 41.0	9.668 3779	0.124 0281	0.122 6325
11	252 31 10.7	2 44 41.3	+ 9 56.7	−2 59 42.6	−18 15.2	9.668 8314	0.121 1946	0.119 7141
12	255 15 49.4	2 44 38.2	10 40.9	3 17 44.4	17 48.3	9.669 0249	0.118 1906	0.116 6235
13	258 0 31.1	2 44 47.3	11 19.3	3 35 18.8	17 20.2	9.668 9583	0.115 0124	0.113 3568
14	260 45 28.1	2 45 8.6	11 51.4	3 52 24.5	16 50.9	9.668 6316	0.111 6560	0.109 9094
15	263 30 52.5	2 45 42.1	12 17.0	4 9 0.2	16 20.3	9.668 0448	0.108 1164	0.106 2763
16	266 16 56.5	2 46 28.0	+12 35.9	−4 25 4.6	−15 48.2	9.667 1973	0.104 3885	0.102 4522
17	269 3 52.6	2 47 26.3	12 47.7	4 40 36.1	15 14.5	9.666 0886	0.100 4667	0 098 4311
18	271 51 53.4	2 48 37.4	12 52.2	4 55 33.0	14 39.0	9.664 7180	0.096 3446	0.094 2064
19	274 41 11.7	2 50 1.3	12 49.3	5 9 53.5	14 1.7	9.663 0847	0.092 0157	0.089 7714
20	277 32 0.5	2 51 38.3	12 38.9	5 23 35.7	13 22.2	9.661 1878	0.087 4726	0.085 1184
21	280 24 33.0	2 53 28.9	+12 20.8	−5 36 37.2	−12 40.4	9.659 0263	0.082 7076	0.080 2392
22	283 19 3.0	2 55 33.4	11 54.9	5 48 55.6	11 56.0	9.656 5992	0.077 7122	0.075 1254
23	286 15 44.7	2 57 52.4	11 21.2	6 0 28.2	11 8.7	9.653 9055	0.072 4777	0.069 7679
24	289 14 52.8	3 0 26.2	10 39.8	6 11 12.0	10 18.3	9.650 9444	0.066 9949	0.064 1574
25	292 16 42.2	3 3 15.2	9 50.7	6 21 3.7	9 24.5	9.647 7151	0.061 2541	0.058 2839
26	295 21 28.6	3 6 20.3	+ 8 54.0	−6 29 59.7	− 8 26.9	9.644 2170	0.055 2453	0.052 1371
27	298 29 28.4	3 9 42.0	7 50.1	6 37 56.0	7 25.0	9.640 4501	0.048 9580	0.045 7067
28	301 40 58.5	3 13 21.0	6 39.3	6 44 48.1	6 18.5	9.636 4149	0.042 3819	0.038 9823
29	304 56 16.4	3 17 17.9	5 22.1	6 50 31.4	5 7.1	9.632 1121	0.035 5066	0.031 9535
30	308 15 40.4	3 21 33.4	3 59.0	6 55 0.6	3 50.3	9.627 5435	0.028 3219	0.024 6105
31	311 39 29.5	3 26 8.3	+ 2 30.8	−6 58 10.0	− 2 27.5	9.622 7120	0.020 8183	0.016 9442
Nov. 1	315 8 3.4	3 31 3.2	+ 0 58.4	6 59 53.3	− 0 58.2	9.617 6217	0.012 9873	0.008 9466
2	318 41 42.6	3 36 18.8	− 0 37.2	7 0 4.0	+ 0 38.0	9.612 2781	0.004 8215	0.000 6114
3	322 20 48.1	3 41 55.8	2 14.6	6 58 34.9	2 21.5	9.606 6885	9.996 3160	9.991 9349
4	326 5 41.4	3 47 54.7	3 52.3	6 55 18.4	4 12.8	9.600 8626	9.987 4683	9.982 9167
5	329 56 44.8	3 54 15.9	− 5 28.6	−6 50 6.5	+ 6 12.3	9.594 8128	9.978 2806	9.973 5610
6	333 54 20.7	4 0 59.6	7 1 5	6 42 50.9	8 20.4	9.588 5546	9.968 7594	9.963 8777
7	337 58 51.6	4 8 5.9	8 28.7	6 33 22.9	10 37.1	9.582 1069	9.958 9184	9.953 8847
8	342 10 39.8	4 15 34.3	9 47.9	6 21 33.9	13 2.4	9.575 4930	9.948 7803	9.943 6098
9	346 30 7.2	4 23 24.1	10 56.4	6 7 15.3	15 36.1	9.568 7410	9.938 3786	9.933 0931
10	350 57 34.8	4 31 34.3	−11 51.4	−5 50 19.1	+18 17.7	9.561 8846	9.927 7609	9.922 3906
11	355 33 22.0	4 40 2.9	12 30.3	5 30 37 8	21 6.0	9.554 9634	9.916 9921	9.911 5769
12	0 17 45.9	4 48 47.3	12 50.2	5 8 5.4	23 59.6	9.548 0238	9.906 1576	9.900 7487
13	5 11 0.8	4 57 44.4	12 48.6	4 42 37.5	26 56.6	9.541 1189	9.895 3664	9.890 0287
14	10 13 17.3	5 6 49.8	12 23.7	4 14 12.1	29 54.2	9.534 3092	9.884 7553	9.879 5680
15	15 24 41.1	5 15 58.0	−11 34.0	−3 42 50.2	+32 48.8	9.527 6625	9.874 4907	9.869 5485
16	20 45 11.8	5 25 2.5	−10 19.0	−3 8 36.8	+35 36.5	9.521 2536	9 864 7686	9.860 1799

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Nov. 16	20 45 11.8	5 25 2.5	−10 19.0	−3 8 36.8	+35 36.5	9.521 2536	9.864 7686	9.860 1799
17	26 14 42 2	5 33 55.8	8 39.4	2 31 41.3	38 12.3	9.515 1632	9.855 8123	9.851 6971
18	31 52 56.8	5 42 29.4	6 37.3	1 52 18.1	40 30.8	9.509 4763	9.847 8662	9.844 3515
19	37 39 31 1	5 50 33.6	4 16.2	1 10 47.5	42 26.1	9.504 2805	9.841 1847	9.838 3964
20	43 33 50.5	5 57 57.8	− 1 41.1	−0 27 35.6	43 52.5	9.499 6634	9.836 0155	9.834 0686
21	49 35 9.8	6 4 31.6	+ 1 1.5	+0 16 46.0	+44 44.5	9.495 7089	9.832 5793	9.831 5676
22	55 42 33.3	6 10 4.4	3 44.0	1 1 40.4	44 57.4	9.492 4940	9.831 0490	9.831 0342
23	61 54 55.0	6 14 26.4	6 18.1	1 46 26.8	44 28.0	9.490 0847	9.831 5288	9.832 5331
24	68 10 59.7	6 17 29.1	8 35.6	2 30 21.8	43 14.6	9.488 5327	9.834 0417	9.836 0440
25	74 29 24.8	6 19 6.1	10 29.0	3 12 41.6	41 17.8	9.487 8725	9.838 5243	9.841 4623
26	80 48 42.0	6 19 13.1	+11 52.0	+3 52 43.7	+38 40.0	9.488 1188	9.844 8338	9.848 6109
27	87 7 20.7	6 17 49.0	12 40.2	4 29 49.5	35 25.9	9.489 2661	9.852 7628	9.857 2570
28	93 23 50.4	6 14 55.5	12 51.6	5 3 25.5	31 41.7	9.491 2888	9.862 0597	9.867 1363
29	99 36 43.7	6 10 37.3	12 26.6	5 33 5.3	27 34.9	9.494 1428	9.872 4525	9.877 9743
30	105 44 39.5	6 5 1.8	11 27.7	5 58 30.2	23 13.3	9.497 7681	9.883 6688	9.889 5046
Dec. 1	111 46 24.9	5 58 18.3	+ 9 59.3	+6 19 29.3	+18 44.8	9.502 0923	9.895 4520	9.901 4832
2	117 40 57.2	5 50 37.5	8 7.2	6 35 59.6	14 16.7	9.507 0342	9.907 5724	9.913 6960
3	123 27 24.7	5 42 10.9	5 57.9	6 48 4.8	9 55.5	9.512 5075	9.919 8326	9.925 9628
4	129 5 7.5	5 33 10.0	3 37.9	6 55 54.4	5 46.3	9.518 4242	9.932 0695	9.938 1374
5	134 33 36.9	5 23 45.9	+ 1 13.8	6 59 42.5	+ 1 52.8	9.524 6979	9.944 1530	9.950 1046
6	139 52 35.0	5 14 9.0	− 1 8.8	+6 59 46.3	− 1 42.1	9.531 2454	9.955 9823	9.961 7777
7	145 1 53.5	5 4 28.3	3 24.9	6 56 25.0	4 57.1	9.537 9894	9.967 4834	9.973 0935
8	150 1 32.7	4 54 51.4	5 30.5	6 49 59.0	7 51.6	9.544 8588	9.978 6033	9.984 0089
9	154 51 39.7	4 45 24.8	7 22.7	6 40 48.7	10 25.8	9.551 7897	9.989 3072	9.994 4960
10	159 32 27.4	4 36 13.6	8 59.5	6 29 14.1	12 40.4	9.558 7254	9.999 5738	0.004 5397
11	164 4 13.3	4 27 21.7	−10 19.6	+6 15 34.1	−14 36.7	9.565 6166	0.009 3933	0.014 1345
12	168 27 18.1	4 18 51.8	11 22.5	6 0 6.4	16 16.0	9.572 4208	0.018 7637	0.023 2816
13	172 42 4.8	4 10 45.9	12 8.4	5 43 7.3	17 39.8	9.579 1017	0.027 6893	0.031 9880
14	176 48 58.2	4 3 5.3	12 37.6	5 24 51.5	18 49.6	9.585 6286	0.036 1790	0.040 2639
15	180 48 23.9	3 55 50.5	12 51.0	5 5 32.3	19 47.0	9.591 9760	0.044 2445	0.048 1226
16	184 40 47.7	3 49 1.6	−12 49.8	+4 45 21.2	−20 33.4	9.598 1231	0.051 9000	0.055 5786
17	188 26 35.6	3 42 38.4	12 35.2	4 24 28.7	21 10.1	9.604 0530	0.059 1604	0.062 6473
18	192 6 12.9	3 36 40.4	12 8.4	4 3 3.9	21 38.3	9.609 7520	0.066 0413	0.069 3444
19	195 40 4.6	3 31 6.9	11 30.9	3 41 14.6	21 59.1	9.615 2092	0.072 5588	0.075 6862
20	199 8 34.7	3 25 57.1	10 44.0	3 19 7.7	22 13.6	9.620 4161	0.078 7285	0.081 6877
21	202 32 6.3	3 21 10.0	− 9 49.1	+2 56 49.1	−22 22.6	9.625 3665	0.084 5658	0.087 3645
22	205 51 1.8	3 16 44.7	8 47.3	2 34 24.0	22 26.9	9.630 0556	0.090 0856	0.092 7309
23	209 5 42.6	3 12 40.3	7 40.0	2 11 56.8	22 26.9	9.634 4802	0.095 3021	0.097 8009
24	212 16 29.0	3 8 55.9	6 28.2	1 49 31.4	22 23.4	9.638 6379	0.100 2289	0.102 5877
25	215 23 40.6	3 5 30.5	5 13.1	1 27 11.0	22 17.0	9.642 5275	0.104 8787	0.107 1034
26	218 27 36.0	3 2 23.3	− 3 55.7	+1 4 58.4	−22 7.8	9.646 1485	0.109 2633	0.111 3598
27	221 28 33.0	2 59 33.5	2 36.8	0 42 56.2	21 56.4	9.649 5007	0.113 3942	0.115 3678
28	224 26 48.6	2 57 0.3	− 1 17.4	+0 21 6.4	21 43.0	9.652 5843	0.117 2819	0.119 1375
29	227 22 39.0	2 54 43.0	+ 0 1.8	−0 0 29.1	21 27.8	9.655 4001	0.120 9359	0.122 6782
30	230 16 19.9	2 52 41.1	1 20.0	0 21 48.6	21 11.0	9.657 9490	0.124 3655	0.125 9987
31	233 8 6.3	2 50 54.0	+ 2 36.5	−0 42 50.6	−20 52.9	9.660 2318	0.127 5788	0.129 1068
32	235 58 12.7	2 49 21.1	+ 3 50.7	−1 3 33.9	−20 33.5	9.662 2495	0.130 5835	0.132 0098

VENUS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Jan. 0	29 9 1.9	1 35 53.6	−3 0.7	-2 28 23.2	+3 53.4	9.859 8923	0.002 6843	9.999 7382
2	32 20 52.2	1 35 56.8	3 0.8	2 20 22.8	4 7.0	9.859 7296	9.996 7632	9.993 7586
4	35 32 48.9	1 36 0.0	2 58.7	2 11 55.7	4 19.9	9.859 5655	9.990 7239	9.987 6586
6	38 44 52.2	1 36 3.3	2 54.4	2 3 3.6	4 32.0	9.859 4006	9.984 5621	9.981 4339
8	41 57 2.0	1 36 6.6	2 47.8	1 53 48.0	4 43.3	9.859 2354	9.978 2736	9.975 0805
10	45 9 18.5	1 36 9.9	−2 39.1	−1 44 10.7	+4 53.8	9.859 0703	9.971 8539	9.968 5935
12	48 21 41.7	1 36 13.3	2 28.4	1 34 13.4	5 3.3	9.858 9060	9.965 2988	9.961 9693
14	51 34 11.8	1 36 16.8	2 15.9	1 23 57.9	5 11.9	9.858 7429	9.958 6046	9.955 2043
16	54 46 48.8	1 36 20.3	2 1.8	1 13 26.2	5 19.5	9.858 5815	9.951 7678	9.948 2946
18	57 59 32.9	1 36 23.8	1 46.1	1 2 40.2	5 26.2	9.858 4223	9.944 7843	9.941 2365
20	61 12 24.0	1 36 27.3	−1 28.9	−0 51 41.9	+5 31.9	9.858 2659	9.937 6508	9.934 0268
22	64 25 22.2	1 36 30.9	1 10.6	0 40 33.3	5 36.5	9.858 1128	9.930 3642	9.926 6625
24	67 38 27.6	1 36 34.5	0 51.5	0 29 16.6	5 40.0	9.857 9633	9.922 9212	9.919 1399
26	70 51 40.3	1 36 38.2	0 31.7	0 17 53.9	5 42.5	9.857 8182	9.915 3181	9.911 4551
28	74 5 0.2	1 36 41.8	−0 11.5	−0 6 27.3	5 43.9	9.857 6777	9.907 5503	9.903 6030
30	77 18 27.3	1 36 45.4	+0 8.9	+0 5 0.9	+5 44.2	9.857 5424	9.899 6124	9.895 5777
Feb. 1	80 32 1.6	1 36 49.0	0 29.2	0 16 28.6	5 43.3	9.857 4127	9.891 4982	9.887 3730
3	83 45 43.1	1 36 52.5	0 49.1	0 27 53.5	5 41.4	9.857 2889	9.883 2013	9.878 9824
5	86 59 31.6	1 36 56.0	1 8.4	0 39 13.5	5 38.4	9.857 1716	9.874 7155	9.870 3996
7	90 13 27.1	1 36 59.5	1 26.9	0 50 26.4	5 34.3	9.857 0611	9.866 0340	9.861 6179
9	93 27 29.5	1 37 2.9	+1 44.2	+1 1 30.0	+5 29.1	9.856 9577	9.857 1504	9.852 6308
11	96 41 38.5	1 37 6.1	2 0.2	1 12 22.1	5 22.8	9.856 8618	9.848 0583	9.843 4323
13	99 55 54.0	1 37 9.3	2 14.7	1 23 0.6	5 15.5	9.856 7738	9.838 7520	9.834 0167
15	103 10 15.8	1 37 12.4	2 27.5	1 33 23.5	5 7.2	9.856 6939	9.829 2258	9.824 3786
17	106 24 43.5	1 37 15.3	2 38.4	1 43 28.7	4 57.8	9.856 6223	9.819 4746	9.814 5132
19	109 39 16.8	1 37 18.0	+2 47.3	+1 53 14.2	+4 47.5	9.856 5593	9.809 4942	9.804 4171
21	112 53 55.4	1 37 20.5	2 54.1	2 2 38.1	4 36.3	9.856 5051	9.799 2816	9.794 0872
23	116 8 38.9	1 37 22.9	2 58.6	2 11 38.6	4 24.1	9.856 4599	9.788 8335	9.783 5201
25	119 23 26.9	1 37 25.0	3 0.8	2 20 13.9	4 11.0	9.856 4239	9.778 1465	9.772 7121
27	122 38 19.0	1 37 26.9	3 0.7	2 28 22.2	3 57.1	9.856 3971	9.767 2164	9.761 6589
Mar. 1	125 53 14.5	1 37 28.5	+2 58.3	+2 36 2.0	+3 42.5	9.856 3796	9.756 0391	9.750 3566
3	129 8 13.0	1 37 29.9	2 53.6	2 43 11.8	3 27.1	9.856 3716	9.744 6111	9.738 8021
5	132 23 13.9	1 37 31.0	2 46.6	2 49 50.2	3 11.1	9.856 3730	9.732 9294	9.726 9930
7	135 38 16.7	1 37 31.7	2 37.5	2 55 55.8	2 54.4	9.856 3839	9.720 9928	9.714 9289
9	138 53 20.6	1 37 32.1	2 26.4	3 1 27.5	2 37.2	9.856 4041	9.708 8017	9.702 6118
11	142 8 25.1	1 37 32.2	+2 13.4	+3 6 24.1	+2 19.4	9.856 4336	9.696 3598	9.690 0463
13	145 23 29.5	1 37 32.0	1 58.7	3 10 44.8	2 1.2	9.856 4724	9.683 6726	9.677 2400
15	148 38 33.0	1 37 31.4	1 42.4	3 14 28.7	1 42.6	9.856 5202	9.670 7504	9.664 2059
17	151 53 35.0	1 37 30.5	1 24.9	3 17 35.1	1 23.7	9.856 5770	9.657 6092	9.650 9634
19	155 8 34.8	1 37 29.2	1 6.3	3 20 3.3	1 4.5	9.856 6426	9.644 2716	9.637 5378
21	158 23 31.7	1 37 27.6	+0 46.8	+3 21 53.0	+0 45.1	9.856 7167	9.630 7664	9.623 9624
23	161 38 25.0	1 37 25.6	0 26.8	3 23 3.8	0 25.6	9.856 7990	9.617 1312	9.610 2788
25	164 53 14.1	1 37 23.3	+0 6.4	3 23 35.5	+0 6.1	9.856 8894	9.603 4119	9.596 5373
27	168 7 58.1	1 37 20.6	−0 14.1	3 23 28.2	−0 13.4	9.856 9876	9.589 6628	9.582 7970
29	171 22 36.4	1 37 17.6	0 34.4	3 22 41.8	0 32.9	9.857 0931	9.575 9491	9.569 1292
31	174 37 8.5	1 37 14.3	−0 54.2	+3 21 16.5	−0 52.3	9.857 2057	9.562 3483	9.555 6181
Apr. 2	177 51 33.7	1 37 10.7	−1 13.3	+3 19 12.7	−1 11.4	9.857 3250	9.548 9516	9.542 3626

VENUS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Apr. 2	177 51 33.7	1 37 10.7	−1 13.3	+3 19 12.7	−1 11.4	9.857 3250	9.548 9516	9.542 3626
4	181 5 51.3	1 37 6.8	1 31.5	3 16 31.0	1 30.2	9.857 4506	9.535 8661	9.529 4783
6	184 20 0.8	1 37 2.6	1 48.5	3 13 11.9	1 48.8	9.857 5821	9.523 2166	9.517 0991
8	187 34 1.8	1 36 58.2	2 4.2	3 9 16.0	2 7.0	9.857 7191	9.511 1448	9.505 3740
10	190 47 53.8	1 36 53.6	2 18.2	3 4 44.2	2 24.7	9.857 8611	9.499 8077	9.494 4678
12	194 1 36.3	1 36 48.8	−2 30.4	+2 59 37.4	−2 41.8	9.858 0077	9.489 3769	9.484 5580
14	197 15 8.9	1 36 43.8	2 40.7	2 53 56.7	2 58.6	9.858 1584	9.480 0341	9.475 8284
16	200 28 31.3	1 36 38.6	2 49.1	2 47 43.3	3 14.7	9.858 3127	9.471 9634	9.468 4613
18	203 41 43.2	1 36 33.3	2 55.3	2 40 58.4	3 30.1	9.858 4703	9.465 3430	9.462 6279
20	206 54 44.5	1 36 27.9	2 59.2	2 33 43.4	3 44.8	9.858 6304	9.460 3333	9.458 4745
22	210 7 34.9	1 36 22.5	−3 0.9	+2 25 59.7	−3 58.7	9.858 7927	9.457 0640	9.456 1116
24	213 20 14.4	1 36 17.0	3 0.4	2 17 48.9	4 11.9	9.858 9566	9.455 6238	9.455 6042
26	216 32 42.9	1 36 11.5	2 57.6	2 9 12.6	4 24.2	9.859 1216	9.456 0533	9.456 9682
28	219 45 0.4	1 36 6.0	2 52.5	2 0 12.4	4 35.7	9.859 2871	9.458 3431	9.460 1695
30	222 57 6.9	1 36 0.5	2 45.3	1 50 50.1	4 46.3	9.859 4527	9.462 4359	9.465 1285
May 2	226 9 2.5	1 35 55.1	−2 36.0	+1 41 7.5	−4 56.0	9.859 6179	9.468 2313	9.471 7263
4	229 20 47.5	1 35 49.9	2 24.8	1 31 6.5	5 4.7	9.859 7822	9.475 5939	9.479 8134
6	232 32 22.0	1 35 44.8	2 11.9	1 20 49.0	5 12.5	9.859 9450	9.484 3633	9.489 2215
8	235 43 46.4	1 35 39.7	1 57.3	1 10 16.9	5 19.3	9.860 1058	9.494 3657	9.499 7734
10	238 55 0.8	1 35 34.8	1 41.2	0 59 32.2	5 25.1	9.860 2641	9.505 4224	9.511 2912
12	242 6 5.7	1 35 30.1	−1 23.9	+0 48 36.9	−5 29.9	9.860 4195	9.517 3588	9.523 6048
14	245 17 1.4	1 35 25.6	1 5.6	0 37 33.1	5 33.6	9.860 5715	9.530 0095	9.536 5541
16	248 27 48.4	1 35 21.4	0 46.5	0 26 22.9	5 36.4	9.860 7195	9.543 2208	9.549 9925
18	251 38 27.2	1 35 17.4	0 26.8	0 15 8.2	5 38.1	9.860 8632	9.556 8530	9.563 7872
20	254 48 58.2	1 35 13.6	−0 6.8	+0 3 51.1	5 38.7	9.861 0021	9.570 7810	9.577 8210
22	257 59 21.9	1 35 10.1	+0 13.2	−0 7 26.2	−5 38.3	9.861 1357	9.584 8948	9.591 9912
24	261 9 38.9	1 35 6.9	0 33.1	0 18 41.8	5 36.9	9.861 2638	9.599 0998	9.606 2111
26	264 19 49.8	1 35 4.0	0 52.6	0 29 53.5	5 34.5	9.861 3858	9.613 3163	9.620 4077
28	267 29 55.0	1 35 1.3	1 11.4	0 40 59.4	5 31.1	9.861 5015	9.627 4783	9.634 5219
30	270 39 55.2	1 34 58.9	1 29.3	0 51 57.4	5 26.7	9.861 6105	9.641 5329	9.648 5064
June 1	273 49 50.9	1 34 56.9	+1 46.1	−1 2 45.6	−5 21.3	9.861 7124	9.655 4379	9.662 3235
3	276 59 42.8	1 34 55.1	2 1.6	1 13 22.0	5 14.9	9.861 8070	9.669 1598	9.675 9439
5	280 9 31.4	1 34 53.6	2 15.7	1 23 44.8	5 7.6	9.861 8939	9.682 6736	9.689 3469
7	283 19 17.3	1 34 52.4	2 28.1	1 33 52.0	4 59.4	9.861 9730	9.695 9620	9.702 5176
9	286 29 1.0	1 34 51.5	2 38.7	1 43 41.9	4 50.3	9.862 0439	9.709 0124	9.715 4455
11	289 38 43.2	1 34 50.8	+2 47.3	−1 53 12.6	−4 40.3	9.862 1065	9.721 8165	9.728 1247
13	292 48 24.3	1 34 50.4	2 53.9	2 2 22.5	4 29.5	9.862 1606	9.734 3697	9.740 5510
15	295 58 5.0	1 34 50.3	2 58.4	2 11 10.0	4 17.9	9.862 2060	9.746 6685	9.752 7217
17	299 7 45.7	1 34 50.4	3 0.7	2 19 33.5	4 5.5	9.862 2425	9.758 7106	9.764 6350
19	302 17 26.9	1 34 50.8	3 0.8	2 27 31.4	3 52.3	9.862 2701	9.770 4949	9.776 2902
21	305 27 9.1	1 34 51.4	+2 58.7	−2 35 2.4	−3 38.5	9.862 2887	9.782 0211	9.787 6875
23	308 36 52.7	1 34 52.2	2 54.5	2 42 5.0	3 24.0	9.862 2982	9.793 2897	9.798 8280
25	311 46 38.2	1 34 53.3	2 48.1	2 48 38.1	3 8.9	9.862 2987	9.804 3027	9.809 7141
27	314 56 25.9	1 34 54.5	2 39.7	2 54 40.4	2 53.3	9.862 2901	9.815 0628	9.820 3493
29	318 6 16.2	1 34 55.9	2 29.3	3 0 10.8	2 37.1	9.862 2723	9.825 5741	9.830 7376
July 1	321 16 9.5	1 34 57.4	+2 17.1	−3 5 8.3	−2 20.4	9.862 2455	9.835 8407	9.840 8838
3	324 26 6.1	1 34 59.2	+2 3.2	−3 9 32.1	−2 3.3	9.862 2098	9.845 8678	9.850 7934

VENUS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
July 1	321 16 9.5	1 34 57.4	+2 17.1	−3 5 8.3	−2 20.4	9.862 2455	9.835 8407	9.840 8838
3	324 26 6.1	1 34 59.2	2 3.2	3 9 32.1	2 3.3	9.862 2098	9.845 8678	9.850 7934
5	327 36 6.4	1 35 1.1	1 47.8	3 13 21.3	1 45.8	9.862 1653	9.855 6615	9.860 4729
7	330 46 10.5	1 35 3.1	1 31.1	3 16 35.2	1 28.0	9.862 1120	9.865 2285	9.869 9292
9	333 56 18.8	1 35 5.2	1 13.3	3 19 13.1	1 9.9	9.862 0501	9 874 5760	9.879 1695
11	337 6 31.4	1 35 7.4	+0 54.6	−3 21 14.6	−0 51.6	9.861 9799	9.883 7107	9.888 2003
13	340 16 48.6	1 35 9.7	0 35.2	3 22 39.2	0 33.1	9.861 9015	9.892 6391	9.897 0279
15	343 27 10.5	1 35 12.2	+0 15.4	3 23 26.7	−0 14.4	9.861 8152	9.901 3671	9.905 6575
17	346 37 37.4	1 35 14.7	−0 4.6	3 23 36.8	+0 4.3	9.861 7212	9.909 8995	9.914 0936
19	349 48 9.4	1 35 17.3	0 24.6	3 23 9.5	0 23.0	9.861 6197	9.918 2403	9.922 3402
21	352 58 46.6	1 35 20.0	−0 44.2	−3 22 4.9	+0 41.7	9.861 5112	9.926 3939	9.930 4017
23	356 9 29.2	1 35 22.7	1 3.4	3 20 22.9	1 0.2	9.861 3959	9.934 3643	9.938 2821
25	359 20 17.2	1 35 25.4	1 21.8	3 18 4.0	1 18.6	9.861 2741	9.942 1555	9.945 9849
27	2 31 10.8	1 35 28.2	1 39.2	3 15 8.6	1 36.8	9.861 1462	9.949 7709	9.953 5140
29	5 42 10.1	1 35 31.1	1 55.3	3 11 37.0	1 54.7	9.861 0126	9.957 2147	9.960 8734
31	8 53 15.1	1 35 34.0	−2 10.0	−3 7 29.7	+2 12.4	9.860 8738	9.964 4907	9.968 0671
Aug. 2	12 4 26.0	1 35 36.9	2 23.2	3 2 47.5	2 29.7	9.860 7301	9.971 6032	9.975 0995
4	15 15 42.8	1 35 39.9	2 34.6	2 57 31.4	2 46.5	9.860 5819	9.978 5569	9.981 9758
6	18 27 5.7	1 35 43.0	2 44.1	2 51 42.1	3 2.8	9.860 4298	9.985 3569	9.988 7009
8	21 38 34.7	1 35 46.1	2 51.6	2 45 20.6	3 18.6	9.860 2742	9.992 0083	9.995 2798
10	24 50 9.9	1 35 49.2	−2 57.0	−2 38 28.1	+3 33.8	9.860 1155	9.998 5159	0.001 7170
12	28 1 51.4	1 35 52.3	3 0.1	2 31 5.8	3 48.4	9.859 9541	0.004 8837	0.008 0163
14	31 13 39.2	1 35 55.5	3 1.0	2 23 15.0	4 2.3	9.859 7907	0.011 1152	0.014 1809
16	34 25 33.5	1 35 58.8	2 59.7	2 14 57.1	4 15.5	9.859 6258	0.017 2136	0.020 2137
18	37 37 34.3	1 36 2.1	2 56.1	2 6 13.6	4 27.9	9.859 4599	0.023 1814	0.026 1171
20	40 49 41.7	1 36 5.4	−2 50.3	−1 57 6.1	+4 39.5	9.859 2934	0.029 0211	0.031 8936
22	44 1 55.9	1 36 8.8	2 42.4	1 47 36.2	4 50.2	9.859 1269	0.034 7350	0.037 5454
24	47 14 16.9	1 36 12.2	2 32.5	1 37 45.7	5 0.1	9.858 9610	0.040 3252	0.043 0746
26	50 26 44.8	1 36 15.7	2 20.6	1 27 36.4	5 9.0	9.858 7961	0.045 7937	0.048 4829
28	53 39 19.6	1 36 19.2	2 6.9	1 17 10.2	5 17.0	9.858 6327	0.051 1425	0.053 7727
30	56 52 1.5	1 36 22.7	−1 51.7	−1 6 28.9	+5 24.1	9.858 4714	0.056 3740	0.058 9465
Sept. 1	60 4 50.5	1 36 26.3	1 35.1	0 55 34.6	5 30.1	9.858 3128	0.061 4906	0.064 0068
3	63 17 46.7	1 36 29.9	1 17.2	0 44 29.4	5 35.1	9.858 1572	0.066 4954	0.068 9569
5	66 30 50.1	1 36 33.5	0 58.3	0 33 15.3	5 39.0	9.858 0052	0.071 3917	0.073 8003
7	69 44 0.8	1 36 37.2	0 38.7	0 21 54.4	5 41.8	9.857 8573	0.076 1829	0.078 5399
9	72 57 18.8	1 36 40.8	−0 18.6	−0 10 28.9	+5 43.5	9.857 7140	0.080 8717	0.083 1785
11	76 10 44.1	1 36 44.4	+0 1.8	+0 0 59.0	5 44.2	9.857 5757	0.085 4605	0.087 7180
13	79 24 16.6	1 36 48.1	0 22.1	0 12 27.2	5 43.8	9.857 4429	0.089 9513	0.092 1607
15	82 37 56.4	1 36 51.7	0 42.2	0 23 53.4	5 42.2	9.857 3160	0.094 3463	0.096 5083
17	85 51 43.3	1 36 55.2	1 1.7	0 35 15.4	5 39.6	9.857 1954	0.098 6469	0.100 7621
19	89 5 37.3	1 36 58.7	+1 20.5	+0 46 31.1	+5 35.9	9.857 0816	0.102 8541	0.104 9232
21	92 19 38.2	1 37 2.1	1 38.3	0 57 38.3	5 31.1	9.856 9748	0.106 9696	0.108 9933
23	95 33 45.9	1 37 5.5	1 54.8	1 8 34.8	5 25.2	9.856 8755	0.110 9944	0.112 9730
25	98 48 0.2	1 37 8.8	2 9.8	1 19 18.4	5 18.2	9.856 7839	0.114 9292	0.116 8631
27	102 2 20.9	1 37 11.9	2 23.2	1 29 47.1	5 10.2	9.856 7004	0.118 7750	0.120 6649
29	105 16 47.7	1 37 14.8	+2 34.8	+1 39 58.8	+5 1.2	9.856 6252	0.122 5331	0.124 3798
Oct. 1	108 31 20.2	1 37 17.6	+2 44.4	+1 49 51.5	+4 51.2	9.856 5586	0.126 2054	0.128 0100

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GREENWICH MEAN NOON.

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		° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Oct.	1	108 31 20.2	1 37 17.6	+2 44.4	+1 49 51.5	+4 51.2	9 856 5586	0.126 2054	0.128 0100
	3	111 45 58.2	1 37 20.3	2 51.9	1 59 23.3	4 40.3	9.856 5009	0.129 7940	0.131 5575
	5	115 0 41.3	1 37 22.7	2 57.2	2 8 32.2	4 28.5	9.856 4521	0.133 3008	0.135 0243
	7	118 15 29.0	1 37 24.9	3 0.3	2 17 16.6	4 15.7	9.856 4125	0.136 7283	0.138 4130
	9	121 30 20.9	1 37 26.9	3 1.0	2 25 34.6	4 2.1	9.856 3822	0.140 0785	0.141 7250
	11	124 45 16.5	1 37 28.6	+2 59.4	+2 33 24.7	+3 47.8	9.856 3614	0.143 3527	0.144 9618
	13	128 0 15.3	1 37 30.1	2 55.5	2 40 45.2	3 32.6	9.856 3500	0.146 5525	0.148 1250
	15	131 15 16.7	1 37 31.2	2 49.3	2 47 34.7	3 16.8	9.856 3480	0.149 6793	0.151 2155
	17	134 30 20.1	1 37 32.1	2 40.9	2 53 52.0	3 0.3	9.856 3556	0.152 7337	0.154 2341
	19	137 45 24.9	1 37 32.6	2 30.5	2 59 35.7	2 43.2	9.856 3727	0.155 7167	0.157 1816
	21	141 0 30.5	1 37 32.8	+2 18.2	+3 4 44.7	+2 25.7	9.856 3992	0.158 6290	0.160 0588
	23	144 15 36.2	1 37 32.7	2 4.1	3 9 18.1	2 7.7	9.856 4350	0.161 4711	0.162 8659
	25	147 30 41.3	1 37 32.3	1 48.3	3 13 15.0	1 49.2	9.856 4801	0.164 2433	0.165 6034
	27	150 45 45.1	1 37 31.5	1 31.2	3 16 34 6	1 30.3	9.856 5343	0.166 9463	0.168 2721
	29	154 0 47.0	1 37 30.3	1 12.9	3 19 16.2	1 11.3	9.856 5973	0.169 5810	0.170 8732
	31	157 15 46.1	1 37 28.7	+0 53.7	+3 21 19.4	+0 52.0	9.856 6690	0.172 1487	0.173 4077
Nov.	2	160 30 41.8	1 37 26.8	0 33.8	3 22 43.8	0 32.5	9.856 7492	0.174 6505	0.175 8773
	4	163 45 33.4	1 37 24.6	+0 13.5	3 23 29.2	+0 12.9	9.856 8375	0.177 0882	0.178 2835
	6	167 0 20.2	1 37 22.1	−0 7.0	3 23 35.5	−0 6.7	9.856 9337	0.179 4635	0.180 6283
	8	170 15 1.6	1 37 19.2	0 27.4	3 23 2.7	0 26.2	9.857 0375	0.181 7780	0.182 9128
	10	173 29 36.8	1 37 15.9	−0 47.4	+3 21 51.0	−0 45.6	9.857 1485	0.184 0328	0.185 1381
	12	176 44 5.3	1 37 12.4	1 6.8	3 20 0.6	1 4.8	9.857 2664	0.186 2290	0.187 3055
	14	179 58 26.4	1 37 8.6	1 25.3	3 17 32.0	1 23.7	9.857 3907	0.188 3677	0.189 4157
	16	183 12 39.5	1 37 4.5	1 42.7	3 14 25.8	1 42.4	9.857 5211	0.190 4496	0.191 4694
	18	186 26 44.2	1 37 0.2	1 58.9	3 10 42.6	2 0.7	9.857 6572	0.192 4751	0.193 4668
	20	189 40 40.0	1 36 55.6	−2 13.5	+3 6 23.2	−2 18.6	9.857 7985	0.194 4445	0.195 4082
	22	192 54 26.4	1 36 50.8	2 26.4	3 1 28.5	2 36.0	9.857 9445	0.196 3580	0.197 2938
	24	196 8 3.0	1 36 45.8	2 37.4	2 55 59.5	2 52.8	9.858 0948	0.198 2158	0.199 1239
	26	199 21 29.4	1 36 40.7	2 46.4	2 49 57.3	3 9.2	9.858 2489	0.200 0183	0.200 8990
	28	202 34 45.4	1 36 35.4	2 53.3	2 43 23.2	3 24.8	9.858 4063	0.201 7661	0.202 6197
	30	205 47 50.8	1 36 30.0	−2 58.1	+2 36 18.5	−3 39.8	9.858 5665	0.203 4599	0.204 2870
Dec.	2	209 0 45.3	1 36 24.5	3 0.6	2 28 44.6	3 54.0	9.858 7290	0.205 1011	0.205 9024
	4	212 13 28.8	1 36 19.0	3 0.8	2 20 43.1	4 7.4	9.858 8933	0.206 6910	0.207 4670
	6	215 26 1.3	1 36 13.4	2 58.8	2 12 15.5	4 20.0	9.859 0588	0.208 2305	0.208 9818
	8	218 38 22.7	1 36 7.9	2 54.5	2 3 23.4	4 31.8	9.859 2250	0.209 7210	0.210 4483
	10	221 50 33.1	1 36 2.4	−2 48.0	+1 54 8.6	−4 42.8	9.859 3915	0.211 1636	0.211 8671
	12	225 2 32.6	1 35 57.0	2 39.5	1 44 32.9	4 52.8	9.859 5577	0.212 5589	0.213 2391
	14	228 14 21.3	1 35 51.7	2 29.0	1 34 38.1	5 1.8	9.859 7230	0.213 9078	0.214 5650
	16	231 25 59.5	1 35 46.5	2 16.6	1 24 26.1	5 9.9	9.859 8870	0.215 2108	0.215 8452
	18	234 37 27.3	1 35 41.4	2 2.5	1 13 58.8	5 17.1	9.860 0492	0.216 4681	0.217 0796
	20	237 48 45.1	1 35 36.4	−1 47.0	+1 3 18.3	−5 23.2	9.860 2090	0.217 6797	0.218 2683
	22	240 59 53.2	1 35 31.6	1 30.1	0 52 26.5	5 28.3	9.860 3660	0.218 8455	0.219 4112
	24	244 10 51.9	1 35 27.1	1 12.1	0 41 25.5	5 32.4	9.860 5196	0.219 9654	0.220 5082
	26	247 21 41.8	1 35 22.8	0 53.2	0 30 17.2	5 35.5	9.860 6695	0.221 0396	0.221 5596
	28	250 32 23.3	1 35 18.7	0 33.7	0 19 3.8	5 37.6	9.860 8151	0.222 0683	0.222 5657
	30	253 42 56.7	1 35 14.8	−0 13.8	+0 7 47.4	−5 38.7	9.860 9561	0.223 0520	0.223 5272
	32	256 53 22.7	1 35 11.2	+0 6.2	−0 3 30.1	−5 38.7	9.861 0920	0.223 9915	0.224 4450

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	° ′ ″	′ ″	″	° ′ ″	″			
Jan. 0	251 31 21.2	32 35.11	+38.2	−0 42 44.1	−58.28	0.174 1282	0.381 3358	0.380 6732
2	252 36 38.2	32 41.94	39.6	0 44 40.4	58.01	0.173 3745	0.380 0046	0.379 3300
4	253 42 9.0	32 48.78	41.0	0 46 36.2	57.72	0.172 6216	0.378 6495	0.377 9632
6	254 47 53.4	32 55.65	42.3	0 48 31.3	57.40	0.171 8698	0.377 2710	0.376 5730
8	255 53 51.6	33 2.52	43.5	0 50 25.8	57.04	0.171 1194	0.375 8694	0.375 1602
10	257 0 3.5	33 9.40	+44.7	−0 52 19.5	−56.65	0.170 3706	0.374 4456	0.373 7256
12	258 6 29.2	33 16.29	45.8	0 54 12.4	56.24	0.169 6237	0.373 0003	0.372 2698
14	259 13 8.7	33 23.19	46.9	0 56 4.5	55.82	0.168 8791	0.371 5342	0.370 7937
16	260 20 2.0	33 30.08	47.9	0 57 55.7	55.38	0.168 1370	0.370 0483	0.369 2982
18	261 27 9.0	33 36.96	48.8	0 59 46.0	54.90	0.167 3977	0.368 5435	0.367 7843
20	262 34 29.8	33 43.85	+49.7	−1 1 35.3	−54.38	0.166 6617	0.367 0208	0.366 2530
22	263 42 4.4	33 50.73	50.4	1 3 23.5	53.83	0.165 9292	0.365 4808	0.364 7044
24	264 49 52.7	33 57.60	51.1	1 5 10.6	53.27	0.165 2005	0.363 9238	0.363 1390
26	265 57 54.8	34 4.45	51.7	1 6 56.6	52.67	0.164 4759	0.362 3502	0.361 5573
28	267 6 10.5	34 11.27	52.3	1 8 41.3	52.04	0.163 7558	0.360 7602	0.359 9590
30	268 14 39.9	34 18.08	+52.7	−1 10 24.7	−51.38	0.163 0406	0.359 1537	0.358 3442
Feb. 1	269 23 22.9	34 24.87	53.1	1 12 6.8	50.70	0.162 3304	0.357 5305	0.356 7128
3	270 32 19.4	34 31.63	53.4	1 13 47.5	49.98	0.161 6257	0.355 8911	0.355 0655
5	271 41 29.4	34 38.35	53.6	1 15 26.7	49.23	0.160 9268	0.354 2359	0.353 4024
7	272 50 52.8	34 45.03	53.7	1 17 4.4	48.45	0.160 2340	0.352 5652	0.351 7244
9	274 0 29.5	34 51.67	+53.8	−1 18 40.5	−47.64	0.159 5477	0.350 8802	0.350 0325
11	275 10 19.5	34 58.27	53.7	1 20 14.9	46.80	0.158 8682	0.349 1815	0.348 3273
13	276 20 22.6	35 4.83	53.6	1 21 47.7	45.94	0.158 1958	0.347 4699	0.346 6095
15	277 30 38.7	35 11.33	53.3	1 23 18.7	45.05	0.157 5309	0.345 7462	0.344 8802
17	278 41 7.8	35 17.76	53.0	1 24 47.9	44.13	0.156 8739	0.344 0116	0.343 1404
19	279 51 49.8	35 24.14	+52.6	−1 26 15.2	−43.18	0.156 2250	0.342 2667	0.341 3906
21	281 2 44.4	35 30.46	52.1	1 27 40.6	42.20	0.155 5846	0.340 5122	0.339 6315
23	282 13 51.6	35 36.71	51.5	1 29 4.0	41.18	0.154 9531	0.338 7484	0.337 8630
25	283 25 11.2	35 42.88	50.8	1 30 25.3	40.13	0.154 3308	0.336 9752	0.336 0850
27	284 36 43.1	35 48.98	50.1	1 31 44.5	39.07	0.153 7180	0.335 1924	0.334 2974
Mar. 1	285 48 27.1	35 55.00	+49.2	−1 33 1.6	−37.98	0.153 1150	0.333 4000	0.332 5002
3	287 0 23.0	36 0.93	48.2	1 34 16.4	36.84	0.152 5223	0.331 5981	0.330 6937
5	288 12 30.7	36 6.78	47.2	1 35 28.9	35.68	0.151 9401	0.329 7869	0.328 8778
7	289 24 50.1	36 12.52	46.1	1 36 39.1	34.50	0.151 3687	0.327 9666	0.327 0533
9	290 37 20.8	36 18.17	44.9	1 37 46.9	33.29	0.150 8086	0.326 1380	0.325 2207
11	291 50 2.7	36 23.73	+43.6	−1 38 52.3	−32.05	0.150 2599	0.324 3014	0.323 3803
13	293 2 55.6	36 29.17	42.2	1 39 55.1	30.78	0.149 7231	0.322 4575	0.321 5331
15	294 15 59.3	36 34.50	40.7	1 40 55.4	29.50	0.149 1984	0.320 6073	0.319 6801
17	295 29 13.5	36 39.72	39.2	1 41 53.1	28.20	0.148 6862	0.318 7516	0.317 8219
19	296 42 38.1	36 44.81	37.6	1 42 48.2	26.86	0.148 1868	0.316 8910	0.315 9591
21	297 56 12.7	36 49.79	+35.9	−1 43 40.5	−25.49	0.147 7005	0.315 0263	0.314 0924
23	299 9 57.2	36 54.64	34.2	1 44 30.1	24.11	0.147 2275	0.313 1574	0.312 2213
25	300 23 51.2	36 59.36	32.4	1 45 17.0	22.72	0.146 7682	0.311 2840	0.310 3455
27	301 37 54.5	37 3.95	30.5	1 46 1.0	21.29	0.146 3229	0.309 4059	0.308 4650
29	302 52 6.9	37 8.39	28.5	1 46 42.1	19.83	0.145 8918	0.307 5227	0.306 5791
31	304 6 28.0	37 12.69	+26.5	−1 47 20.3	−18.37	0.145 4751	0.305 6342	0.304 6879
Apr. 2	305 20 57.6	37 16.84	+24.5	−1 47 55.6	−16.90	0.145 0733	0.303 7402	0.302 7910

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Apr. 2	305 20 57.6	37 16.84	+24.5	−1 47 55.6	−16.90	0.145 0733	0.303 7402	0.302 7910
4	306 35 35.3	37 20.85	22.4	1 48 27.9	15.40	0.144 6865	0.301 8405	0.300 8886
6	307 50 20.9	37 24.71	20.2	1 48 57.2	13.88	0.144 3149	0.299 9354	0.298 9810
8	309 5 14.1	37 28.40	18.0	1 49 23.4	12.35	0.143 9589	0.298 0253	0.297 0684
10	310 20 14.5	37 31.95	15.8	1 49 46.6	10.82	0.143 6187	0.296 1105	0.295 1515
12	311 35 21.8	37 35.33	+13.6	−1 50 6.7	− 9.27	0.143 2944	0.294 1915	0.293 2304
14	312 50 35.6	37 38.54	11.3	1 50 23.7	7.70	0.142 9863	0.292 2683	0.291 3054
16	314 5 55.8	37 41.58	9.0	1 50 37.5	6.10	0.142 6946	0.290 3418	0.289 3775
18	315 21 21.9	37 44.46	6.6	1 50 48.1	4.50	0.142 4194	0.288 4124	0.287 4465
20	316 36 53.5	37 47.16	4.3	1 50 55.5	2.89	0.142 1611	0.286 4798	0.285 5122
22	317 52 30.4	37 49.69	+ 1.9	−1 50 59.6	− 1.29	0.141 9197	0.284 5438	0.283 5745
24	319 8 12.2	37 52.03	− 0.5	1 51 0.6	+ 0.31	0.141 6954	0.282 6040	0.281 6322
26	320 23 58.4	37 54.19	2.8	1 50 58.4	1.93	0.141 4884	0.280 6590	0.279 6844
28	321 39 48.8	37 56.17	5.2	1 50 52.9	3.55	0.141 2988	0.278 7083	0.277 7306
30	322 55 43.0	37 57.97	7.6	1 50 44.2	5.18	0.141 1267	0.276 7512	0.275 7701
May 2	324 11 40.6	37 59.58	− 9.9	−1 50 32.2	+ 6.82	0.140 9723	0.274 7874	0.273 8030
4	325 27 41.2	38 1.01	12.2	1 50 16.9	8.45	0.140 8357	0.272 8167	0.271 8285
6	326 43 44.5	38 2.24	14.5	1 49 58.4	10.05	0.140 7169	0.270 8384	0.269 8464
8	327 59 50.1	38 3.28	16.8	1 49 36.7	11.66	0.140 6161	0.268 8524	0.267 8566
10	329 15 57.5	38 4.13	19.1	1 49 11.8	13.27	0.140 5333	0.266 8590	0.265 8596
12	330 32 6.4	38 4.80	−21.3	−1 48 43.6	+14.88	0.140 4686	0.264 8585	0.263 8557
14	331 48 16.5	38 5.27	23.4	1 48 12.2	16.48	0.140 4220	0.262 8510	0.261 8444
16	333 4 27.4	38 5.55	25.6	1 47 37.7	18.07	0.140 3935	0.260 8360	0.259 8257
18	334 20 38.6	38 5.64	27.6	1 47 0.0	19.65	0.140 3830	0.258 8135	0.257 7992
20	335 36 49.8	38 5.54	29.6	1 46 19.1	21.25	0.140 3908	0.256 7828	0.255 7642
22	336 53 0.6	38 5.24	−31.6	−1 45 35.0	+22.80	0.140 4167	0.254 7432	0.253 7196
24	338 9 10.6	38 4.72	33.5	1 44 47.9	24.33	0.140 4608	0.252 6933	0.251 6642
26	339 25 19.3	38 4.00	35.3	1 43 57.7	25.85	0.140 5230	0.250 6320	0.249 5965
28	340 41 26.4	38 3.13	37.1	1 43 4.5	27.35	0.140 6033	0.248 5577	0.247 5155
30	341 57 31.7	38 2.09	38.8	1 42 8.3	28.85	0.140 7016	0.246 4698	0.245 4205
June 1	343 13 34.7	38 0.83	−40.4	−1 41 9.1	+30.33	0.140 8179	0.244 3674	0.243 3105
3	344 29 34.9	37 59.37	41.9	1 40 7.0	31.78	0.140 9520	0.242 2496	0.241 1845
5	345 45 32.0	37 57.74	43.4	1 39 2.0	33.20	0.141 1039	0.240 1154	0.239 0423
7	347 1 25.7	37 55.91	44.7	1 37 54.2	34.63	0.141 2734	0.237 9651	0.236 8837
9	348 17 15.5	37 53.90	46.0	1 36 43.5	36.05	0.141 4605	0.235 7982	0.234 7085
11	349 33 1.2	37 51.73	−47.2	−1 35 30.0	+37.40	0.141 6650	0.233 6146	0.232 5165
13	350 48 42.3	37 49.36	48.3	1 34 13.9	38.73	0.141 8867	0.231 4141	0.230 3072
15	352 4 18.5	37 46.80	49.3	1 32 55.1	40.05	0.142 1256	0.229 1958	0.228 0798
17	353 19 49.4	37 44.08	50.2	1 31 33.7	41.33	0.142 3815	0.226 9590	0.225 8332
19	354 35 14.7	37 41.21	51.0	1 30 9.8	42.58	0.142 6541	0.224 7022	0.223 5659
21	355 50 34.1	37 38.16	−51.7	−1 28 43.4	+43.80	0.142 9434	0.222 4240	0.221 2764
23	357 5 47.2	37 34.92	52.3	1 27 14.6	45.00	0.143 2491	0.220 1229	0.218 9633
25	358 20 53.6	37 31.52	52.8	1 25 43.4	46.18	0.143 5710	0.217 7973	0.216 6248
27	359 35 53.1	37 27.98	53.2	1 24 9.9	47.33	0.143 9089	0.215 4456	0.214 2596
29	0 50 45.4	37 24.27	53.5	1 22 34.1	48.45	0.144 2626	0.213 0665	0.211 8663
July 1	2 5 30.1	37 20.42	−53.7	−1 20 56.1	+49.53	0.144 6318	0.210 6587	0.209 4435
3	3 20 7.0	37 16.41	−53.8	−1 19 16.0	+50.55	0.145 0162	0.208 2207	0.206 9902

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July 1	2 5 30.1	37 20.42	−53.7	−1 20 56.1	+49.53	0.144 6318	0.210 6587	0.209 4435
3	3 20 7.0	37 16.41	53.8	1 19 16.0	50.55	0.145 0162	0.208 2207	0.206 9902
5	4 34 35.7	37 12.23	53.8	1 17 33.9	51.55	0.145 4157	0.205 7520	0.204 5060
7	5 48 55.8	37 7.92	53.7	1 15 49.8	52.55	0.145 8300	0.203 2521	0.201 9902
9	7 3 7.2	37 3.50	53.5	1 14 3.7	53.50	0.146 2589	0.200 7204	0.199 4426
11	8 17 9.7	36 58.92	−53.2	−1 12 15.8	+54.38	0.146 7020	0.198 1567	0.196 8626
13	9 31 2.8	36 54.20	52.8	1 10 26.2	55.25	0.147 1590	0.195 5601	0.194 2491
15	10 44 46.4	36 49.37	52.3	1 8 34.8	56.10	0.147 6297	0.192 9294	0.191 6008
17	11 58 20.2	36 44.40	51.7	1 6 41.8	56.90	0.148 1139	0.190 2631	0.188 9160
19	13 11 43.9	36 39.30	51.0	1 4 47.2	57.65	0.148 6112	0.187 5592	0.186 1926
21	14 24 57.3	36 34.10	−50.2	−1 2 51.2	+58.38	0.149 1212	0.184 8160	0.183 4290
23	15 38 0.2	36 28.77	49.3	1 0 53.7	59.10	0.149 6437	0.182 0314	0.180 6230
25	16 50 52.3	36 23.34	48.3	0 58 54.8	59.77	0.150 1785	0.179 2036	0.177 7728
27	18 3 33.5	36 17.81	47.3	0 56 54.6	60.40	0.150 7251	0.176 3305	0.174 8766
29	19 16 3.5	36 12.17	46.2	0 54 53.2	60.95	0.151 2832	0.173 4108	0.171 9328
31	20 28 22.1	36 6.44	−45.0	−0 52 50.8	+61.50	0.151 8525	0.170 4426	0.168 9400
Aug. 2	21 40 29.2	36 0.64	43.7	0 50 47.2	62.05	0.152 4328	0.167 4249	0.165 8971
4	22 52 24.6	35 54.74	42.4	0 48 42.6	62.55	0.153 0236	0.164 3566	0.162 8033
6	24 4 8.1	35 48.76	41.0	0 46 37.0	63.00	0.153 6247	0.161 2371	0.159 6581
8	25 15 39.6	35 42.68	39.5	0 44 30.6	63.40	0.154 2356	0.158 0661	0.156 4610
10	26 26 58.8	35 36.51	−38.0	−0 42 23.4	+63.78	0.154 8560	0.154 8427	0.153 2108
12	27 38 5.6	35 30.28	36.4	0 40 15.5	64.10	0.155 4857	0.151 5652	0.149 9057
14	28 48 59.9	35 24.01	34.7	0 38 7.0	64.40	0.156 1242	0.148 2320	0.146 5440
16	29 59 41.6	35 17.68	33.0	0 35 57.9	64.70	0.156 7713	0.144 8414	0.143 1238
18	31 10 10.6	35 11.28	31.2	0 33 48.2	64.98	0.157 4266	0.141 3910	0.139 6427
20	32 20 26.7	35 4.83	−29.4	−0 31 38.0	+65.17	0.158 0898	0.137 8786	0.136 0985
22	33 30 29.9	34 58.33	27.5	0 29 27.5	65.33	0.158 7605	0.134 3020	0.132 4889
24	34 40 20.0	34 51.77	25.6	0 27 16.7	65.47	0.159 4383	0.130 6589	0.128 8118
26	35 49 56.9	34 45.16	23.7	0 25 5.6	65.60	0.160 1230	0.126 9474	0.125 0653
28	36 59 20.6	34 38.51	21.7	0 22 54.3	65.70	0.160 8142	0.123 1654	0.121 2474
30	38 8 30.9	34 31.81	−19.7	−0 20 42.8	+65.77	0.161 5116	0.119 3113	0.117 3570
Sept. 1	39 17 27.8	34 25.08	17.7	0 18 31.3	65.78	0.162 2148	0.115 3843	0.113 3931
3	40 26 11.2	34 18.34	15.6	0 16 19.8	65.76	0.162 9235	0.111 3834	0.109 3553
5	41 34 41.1	34 11.59	13.6	0 14 8.2	65.73	0.163 6373	0.107 3086	0.105 2432
7	42 42 57.5	34 4.80	11.5	0 11 56.8	65.67	0.164 3560	0.103 1588	0.101 0554
9	43 51 0.3	33 57.99	− 9.4	−0 9 45.6	+65.58	0.165 0792	0.098 9328	0.096 7907
11	44 58 49.4	33 51.18	7.3	0 7 34.5	65.48	0.165 8066	0.094 6289	0.092 4471
13	46 6 25.0	33 44.35	5.2	0 5 23.7	65.31	0.166 5379	0.090 2452	0.088 0228
15	47 13 46.9	33 37.50	3.1	0 3 13.3	65.12	0.167 2726	0.085 7796	0.083 5154
17	48 20 55.0	33 30.65	− 1.0	−0 1 3.2	64.92	0.168 0105	0.081 2299	0.078 9228
19	49 27 49.4	33 23.81	+ 1.1	+0 1 6.4	+64.70	0.168 7514	0.076 5938	0.074 2428
21	50 34 30.2	33 16.98	3.2	0 3 15.6	64.48	0.169 4949	0.071 8696	0.069 4738
23	51 40 57.4	33 10.15	5.3	0 5 24.3	64.20	0.170 2406	0.067 0549	0.064 6129
25	52 47 10.8	33 3.30	7.3	0 7 32.4	63.92	0.170 9884	0.062 1478	0.059 6593
27	53 53 10.6	32 56.47	9.3	0 9 40.0	63.62	0.171 7379	0.057 1473	0.054 6118
29	54 58 56.7	32 49.66	+11.3	+0 11 46.9	+63.27	0.172 4887	0.052 0528	0.049 4703
Oct. 1	56 4 29.2	32 42.88	+13.3	+0 13 53.1	+62.90	0.173 2406	0.046 8644	0.044 2351

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Oct. 1	56 4 29.2	32 42.88	+13.3	+0 13 53.1	+62.90	0.173 2406	0.046 8644	0.044 2351
3	57 9 48.2	32 36.10	15.3	0 15 58.5	62.50	0.173 9933	0.041 5824	0.038 9063
5	58 14 53.6	32 29.32	17.2	0 18 3.1	62.10	0.174 7466	0.036 2070	0.033 4844
7	59 19 45.5	32 22.57	19.1	0 20 6.9	61.69	0.175 5001	0.030 7385	0.027 9692
9	60 24 23.9	32 15.87	21.0	0 22 9.9	61.26	0.176 2536	0.025 1766	0.022 3605
11	61 28 49.0	32 9.19	+22.8	+0 24 11.9	+60.81	0.177 0067	0.019 5208	0.016 6574
13	62 33 0.7	32 2.53	24.6	0 26 13.1	60.35	0.177 7593	0.013 7703	0.010 8593
15	63 36 59.1	31 55.90	26.4	0 28 13.3	59.85	0.178 5110	0.007 9244	0.004 9656
17	64 40 44.3	31 49.32	28.1	0 30 12.5	59.35	0.179 2617	0.001 9831	9.998 9767
19	65 44 16.4	31 42.77	29.8	0 32 10.7	58.83	0.180 0110	9.995 9464	9.992 8924
21	66 47 35.4	31 36.25	+31.5	+0 34 7.8	+58.27	0.180 7587	9.989 8148	9.986 7137
23	67 50 41.4	31 29.76	33.1	0 36 3.8	57.73	0.181 5045	9.983 5894	9.980 4421
25	68 53 34.4	31 23.32	34.6	0 37 58.7	57.17	0.182 2483	9.977 2722	9.974 0803
27	69 56 14.7	31 16.93	36.1	0 39 52.5	56.60	0.182 9898	9.970 8668	9.967 6323
29	70 58 42.2	31 10.57	37.5	0 41 45.1	55.98	0.183 7287	9.964 3776	9.961 1034
31	72 0 57.0	31 4.27	+38.9	+0 43 36.4	+55.35	0.184 4648	9.957 8104	9.954 4994
Nov. 2	73 2 59.3	30 58.02	40.2	0 45 26.5	54.75	0.185 1979	9.951 1712	9.947 8268
4	74 4 49.1	30 51.80	41.4	0 47 15.4	54.13	0.185 9278	9.944 4669	9.941 0922
6	75 6 26.5	30 45.64	42.6	0 49 3.0	53.47	0.186 6543	9.937 7037	9.934 3024
8	76 7 51.7	30 39.54	43.7	0 50 49.3	52.82	0.187 3771	9.930 8892	9.927 4652
10	77 9 4.7	30 33.50	+44.8	+0 52 34.3	+52.15	0.188 0961	9.924 0314	9.920 5889
12	78 10 5.7	30 27.52	45.8	0 54 17.9	51.45	0.188 8110	9.917 1388	9.913 6825
14	79 10 54.8	30 21.57	46.8	0 56 0.1	50.78	0.189 5217	9.910 2214	9.906 7570
16	80 11 32.0	30 15.67	47.7	0 57 41.0	50.10	0.190 2279	9.903 2908	9.899 8244
18	81 11 57.5	30 9.84	48.6	0 59 20.5	49.40	0.190 9295	9.896 3597	9.892 8986
20	82 12 11.4	30 4.07	+49.4	+1 0 58.6	+48.68	0.191 6263	9.889 4432	9.885 9959
22	83 12 13.8	29 58.37	50.1	1 2 35.2	47.95	0.192 3181	9.882 5591	9.879 1352
24	84 12 4.9	29 52.72	50.7	1 4 10.4	47.25	0.193 0047	9.875 7271	9.872 3377
26	85 11 44.7	29 47.13	51.3	1 5 44.2	46.53	0.193 6860	9.868 9703	9.865 6280
28	86 11 13.4	29 41.62	51.8	1 7 16.5	45.77	0.194 3618	9.862 3141	9.859 0321
30	87 10 31.2	29 36.17	+52.3	+1 8 47.3	+45.02	0.195 0319	9.855 7854	9.852 5774
Dec. 2	88 9 38.1	29 30.77	52.7	1 10 16.6	44.25	0.195 6961	9.849 4118	9.846 2926
4	89 8 34.3	29 25.45	53.0	1 11 44.3	43.50	0.196 3544	9.843 2234	9.840 2078
6	90 7 19.9	29 20.19	53.3	1 13 10.6	42.75	0.197 0066	9.837 2498	9.834 3534
8	91 5 55.1	29 14.98	53.5	1 14 35.3	41.98	0.197 6525	9.831 5227	9.828 7616
10	92 4 19.9	29 9.84	+53.7	+1 15 58.5	+41.20	0.198 2919	9.826 0742	9.823 4648
12	93 2 34.5	29 4.79	53.8	1 17 20.1	40.40	0.198 9247	9.820 9377	9.818 4970
14	94 0 39.1	28 59.81	53.8	1 18 40.1	39.62	0.199 5509	9.816 1470	9.813 8921
16	94 58 33.8	28 54.89	53.8	1 19 58.6	38.85	0.200 1702	9.811 7366	9.809 6848
18	95 56 18.7	28 50.03	53.7	1 21 15.5	38.08	0.200 7825	9.807 7410	9.805 9098
20	96 53 54.0	28 45.24	+53.5	+1 22 30.9	+37.28	0.201 3876	9.804 1955	9.802 6025
22	97 51 19.7	28 40.51	53.2	1 23 44.6	36.48	0.201 9856	9.801 1349	9.799 7964
24	98 48 36.0	28 35.86	52.9	1 24 56.8	35.67	0.202 5763	9.798 5910	9.797 5223
26	99 45 43.2	28 31.30	52.6	1 26 7.3	34.85	0.203 1595	9.796 5938	9.795 8084
28	100 42 41.3	28 26.81	52.2	1 27 16.2	34.05	0.203 7351	9.795 1686	9.794 6768
30	101 39 30.5	28 22.39	+51.8	+1 28 23.5	+33.25	0.204 3030	9.794 3349	9.794 1443
32	102 36 10.9	28 18.04	+51.3	+1 29 29.2	+32.45	0.204 8631	9.794 1061	9.794 2213

JUPITER.

GREENWICH MEAN NOON.

Date	Heliocentric Longitude, Mean Equinox of Date	Daily Motion	Reduction to Orbit.	Heliocentric Latitude	Daily Motion.	Logarithm of Radius Vector	Logarithm of Distance from Earth—	
							At Date	At Intermediate Date.
	° ′ ″	′ ″	″	° ′ ″	″			
Jan. 2	267 46 55.8	4 52.75	−10.8	+0 16 0.8	−6.55	0.720 7186	0.793 5280	0.792 9977
6	268 6 27.1	4 52.90	10.5	0 15 34.6	6.56	0.720 6027	0.792 4072	0.791 7562
10	268 25 59.1	4 53.05	10.2	0 15 8.3	6.57	0.720 4865	0.791 0449	0.790 2737
14	268 45 31.7	4 53.21	9.9	0 14 42.0	6.58	0.720 3701	0.789 4431	0.788 5534
18	269 5 4.9	4 53.37	9.6	0 14 15.7	6.59	0.720 2535	0.787 6049	0.786 5979
22	269 24 38.7	4 53.53	− 9.3	+0 13 49.3	−6.60	0.720 1366	0.785 5328	0.784 4098
26	269 44 13.1	4 53.68	9.1	0 13 22.9	6.61	0.720 0196	0.783 2293	0.781 9915
30	270 3 48.2	4 53.84	8.8	0 12 56.4	6.62	0.719 9024	0.780 6965	0.779 3444
Feb. 3	270 23 23.9	4 54.00	8.5	0 12 29.9	6.63	0.719 7850	0.777 9356	0.776 4703
7	270 43 0.2	4 54.16	8.2	0 12 3.4	6.64	0.719 6675	0.774 9492	0.773 3729
11	271 2 37.2	4 54.32	− 7.9	+0 11 36.8	−6.65	0.719 5498	0.771 7423	0.770 0582
15	271 22 14.8	4 54.48	7.6	0 11 10.2	6.66	0.719 4319	0.768 3213	0.766 5322
19	271 41 53.1	4 54.64	7.3	0 10 43.6	6.67	0.719 3139	0.764 6918	0.762 8010
23	272 1 32.0	4 54.80	7.0	0 10 16.9	6.67	0.719 1957	0.760 8604	0.758 8705
27	272 21 11.5	4 54.96	6.7	0 9 50.1	6.68	0.719 0773	0.756 8320	0.754 7454
Mar. 3	272 40 51.7	4 55.13	− 6.4	+0 9 23.4	−6.69	0.718 9587	0.752 6119	0.750 4326
7	273 0 32.6	4 55.29	6.1	0 8 56.6	6.70	0.718 8401	0.748 2085	0.745 9407
11	273 20 14.1	4 55.45	5.8	0 8 29.8	6.71	0.718 7213	0.743 6307	0.741 2800
15	273 39 56.2	4 55.61	5.5	0 8 2.9	6.71	0.718 6023	0.738 8902	0.736 4628
19	273 59 38.9	4 55.77	5.2	0 7 36.0	6.72	0.718 4832	0.733 9993	0.731 5013
23	274 19 22.3	4 55.93	− 4.9	+0 7 9.1	−6.73	0.718 3639	0.728 9703	0.726 4078
27	274 39 6.4	4 56.10	4.6	0 6 42.2	6.74	0.718 2445	0.723 8151	0.721 1936
31	274 58 51.1	4 56.26	4.3	0 6 15.2	6.75	0.718 1250	0.718 5457	0.715 8731
Apr. 4	275 18 36.5	4 56.42	4.0	0 5 48.2	6.75	0.718 0053	0.713 1782	0.710 4635
8	275 38 22.5	4 56.58	3.7	0 5 21.2	6.76	0.717 8855	0.707 7315	0.704 9847
12	275 58 9.2	4 56.75	− 3.4	+0 4 54.2	−6.77	0.717 7656	0.702 2259	0.699 4577
16	276 17 56.5	4 56.91	3.1	0 4 27.1	6.77	0.717 6456	0.696 6830	0.693 9049
20	276 37 44.5	4 57.08	2.8	0 4 0.0	6.78	0.717 5255	0.691 1256	0.688 3479
24	276 57 33.2	4 57.25	2.5	0 3 32.9	6.78	0.717 4053	0.685 5748	0.682 8092
28	277 17 22.5	4 57.42	2.1	0 3 5.7	6.79	0.717 2850	0.680 0547	0.677 3149
May 2	277 37 12.5	4 57.58	− 1.8	+0 2 38.6	−6.79	0.717 1645	0.674 5932	0.671 8927
6	277 57 3.1	4 57.74	1.5	0 2 11.4	6.80	0.717 0439	0.669 2181	0.666 5736
10	278 16 54.4	4 57.91	1.2	0 1 44.2	6.80	0.716 9232	0.663 9633	0.661 3915
14	278 36 46.4	4 58.07	0.9	0 1 17.0	6.81	0.716 8025	0.658 8619	0.656 3781
18	278 56 39.0	4 58.24	0.6	0 0 49.7	6.81	0.716 6817	0.653 9441	0.651 5639
22	279 16 32.3	4 58.41	− 0.3	+0 0 22.4	−6.82	0.716 5608	0.649 2415	0.646 9807
26	279 36 26.3	4 58.57	0.0	−0 0 4.8	6.82	0.716 4399	0.644 7859	0.642 6613
30	279 56 20.9	4 58.74	+ 0.3	0 0 32.1	6.82	0.716 3189	0.640 6112	0.638 6399
June 3	280 16 16.2	4 58.90	0.7	0 0 59.4	6.83	0.716 1978	0.636 7516	0.634 9503
7	280 36 12.2	4 59.07	1.0	0 1 26.7	6.83	0.716 0766	0.633 2401	0.631 6250
11	280 56 8.8	4 59.24	+ 1.3	−0 1 54.1	−6.83	0.715 9553	0.630 1087	0.628 6938
15	281 16 6.1	4 59.40	1.6	0 2 21.4	6.83	0.715 8340	0.627 3832	0.626 1801
19	281 36 4.0	4 59.57	1.9	0 2 48.7	6.83	0.715 7127	0.625 0866	0.624 1053
23	281 56 2.6	4 59.73	2.2	0 3 16.1	6.84	0.715 5913	0.623 2382	0.622 4880
27	282 16 1.9	4 59.90	2.5	0 3 43.5	6.84	0.715 4699	0.621 8565	0.621 3454
July 1	282 36 1.9	5 0.07	+ 2.8	−0 4 10.8	−6.84	0.715 3484	0.620 9561	0.620 6897
5	282 56 2.6	5 0.23	+ 3.2	−0 4 38.2	−6.84	0.715 2269	0.620 5471	0.620 5284

JUPITER.

GREENWICH MEAN NOON.

Date	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	′ ″	″	° ′ ″	″			
July 1	282 36 1.9	5 0.07	+ 2.8	−0 4 10.8	−6.84	0.715 3484	0.620 9561	0.620 6897
5	282 56 2.6	5 0.23	3.2	0 4 38.2	6.84	0.715 2269	0.620 5471	0.620 5284
9	283 16 3.9	5 0.40	3.5	0 5 5.6	6.84	0.715 1053	0.620 6335	0.620 8616
13	283 36 5.9	5 0.57	3.8	0 5 33.0	6.84	0.714 9837	0.621 2116	0.621 6822
17	283 56 8.5	5 0.74	4.1	0 6 0.4	6.85	0.714 8621	0.622 2720	0.622 9793
21	284 16 11.8	5 0.91	+ 4.4	−0 6 27.8	−6.85	0.714 7404	0.623 8024	0.624 7392
25	284 36 15.8	5 1.08	4.7	0 6 55.2	6.85	0.714 6188	0.625 7876	0.626 9453
29	284 56 20.5	5 1.25	5.0	0 7 22.6	6.85	0.714 4971	0.628 2095	0.629 5772
Aug. 2	285 16 25.9	5 1.42	5.3	0 7 50.0	6.85	0.714 3754	0.631 0451	0.632 6100
6	285 36 31.9	5 1.59	5.6	0 8 17.4	6.85	0.714 2537	0.634 2682	0.636 0154
10	285 56 38.6	5 1.76	+ 5.9	−0 8 44.8	−6.85	0.714 1320	0.637 8472	0.639 7595
14	286 16 46.0	5 1.93	6.2	0 9 12.2	6.85	0.714 0103	0.641 7482	0.643 8092
18	286 36 54.1	5 2.10	6.5	0 9 39.6	6.85	0.713 8886	0.645 9386	0.648 1323
22	286 57 2.8	5 2.27	6.8	0 10 7.0	6.85	0.713 7669	0.650 3864	0.652 6969
26	287 17 12.2	5 2.44	7.1	0 10 34.4	6.84	0.713 6452	0.655 0599	0.657 4713
30	287 37 22.3	5 2.61	+ 7.4	−0 11 1.7	−6.84	0.713 5236	0.659 9270	0.662 4230
Sept. 3	287 57 33.1	5 2.78	7.7	0 11 29.1	6.84	0.713 4020	0.664 9548	0.667 5181
7	288 17 44.5	5 2.95	8.0	0 11 56.4	6.84	0.713 2804	0.670 1089	0.672 7232
11	288 37 56.6	5 3.12	8.3	0 12 23.8	6.84	0.713 1588	0.675 3572	0.678 0075
15	288 58 9.4	5 3.29	8.6	0 12 51.2	6.83	0.713 0373	0.680 6707	0.683 3435
19	289 18 22.9	5 3.46	+ 8.9	−0 13 18.5	−6.83	0.712 9158	0.686 0228	0.688 7057
23	289 38 37.1	5 3.63	9.2	0 13 45.8	6.83	0.712 7944	0.691 3894	0.694 0709
27	289 58 51.9	5 3.80	9.5	0 14 13.1	6.83	0.712 6730	0.696 7471	0.699 4152
Oct. 1	290 19 7.4	5 3.97	9.8	0 14 40.4	6.82	0.712 5517	0.702 0723	0.704 7154
5	290 39 23.6	5 4.13	10.1	0 15 7.7	6.82	0.712 4304	0.707 3419	0.709 9493
9	290 59 40.5	5 4.30	+10.4	−0 15 34.9	−6.81	0.712 3092	0.712 5352	0.715 0974
13	291 19 58.0	5 4.47	10.7	0 16 2.2	6.81	0.712 1881	0.717 6340	0.720 1434
17	291 40 16.2	5 4.64	11.0	0 16 29.4	6.81	0.712 0670	0.722 6239	0.725 0738
21	292 0 35.1	5 4.81	11.3	0 16 56.6	6.80	0.711 9460	0.727 4915	0.729 8752
25	292 20 54.7	5 4.98	11.6	0 17 23.8	6.80	0.711 8251	0.732 2234	0.734 5344
29	292 41 15.0	5 5.15	+11.9	−0 17 50.9	−6.79	0.711 7043	0.736 8065	0.739 0380
Nov. 2	293 1 36.0	5 5.32	12.2	0 18 18.1	6.79	0.711 5836	0.741 2273	0.743 3732
6	293 21 57.6	5 5.49	12.5	0 18 45.2	6.78	0.711 4630	0.745 4746	0.747 5305
10	293 42 19.9	5 5.66	12.7	0 19 12.3	6.78	0.711 3425	0.749 5399	0.751 5020
14	294 2 42.9	5 5.83	13.0	0 19 39.3	6.77	0.711 2221	0.753 4161	0.755 2814
18	294 23 6.6	5 6.00	+13.3	−0 20 6.4	−6.76	0.711 1018	0.757 0971	0.758 8624
22	294 43 30.9	5 6.17	13.6	0 20 33.4	6.76	0.710 9816	0.760 5765	0.762 2385
26	295 3 55.9	5 6.34	13.8	0 21 0.4	6.75	0.710 8615	0.763 8474	0.765 4024
30	295 24 21.6	5 6.51	14.1	0 21 27.3	6.74	0.710 7415	0.766 9027	0.768 3477
Dec. 4	295 44 48.0	5 6.68	14.4	0 21 54.2	6.73	0.710 6217	0.769 7369	0.771 0699
8	296 5 15.1	5 6.85	+14.6	−0 22 21.1	−6.72	0.710 5020	0.772 3463	0.773 5658
12	296 25 42.8	5 7.02	14.9	0 22 48.0	6.72	0.710 3825	0.774 7282	0.775 8334
16	296 46 11.2	5 7.19	15.2	0 23 14.8	6.71	0.710 2631	0.776 8812	0.777 8711
20	297 6 40.3	5 7.35	15.4	0 23 41.6	6.70	0.710 1438	0.778 8026	0.779 6754
24	297 27 10.0	5 7.52	15.7	0 24 8.4	6.69	0.710 0246	0.780 4890	0.781 2430
28	297 47 40.4	5 7.69	+16.0	−0 24 35.1	−6.68	0.709 9056	0.781 9372	0.782 5711
32	298 8 11.5	5 7.86	+16.2	−0 25 1.8	−6.67	0.709 7869	0.783 1444	0.783 6572

SATURN.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	′ ″	′ ″	° ′ ″	″			
Jan. 2	62 5 42.4	2 12.96	−1 35.6	−1 55 57.0	+3.65	0.957 7852	0.921 0688	0.922 2874
6	62 14 34.4	2 12.98	1 35.7	1 55 42.4	3.66	0.957 7565	0.923 5475	0.924 8466
10	62 23 26.3	2 12.99	1 35.8	1 55 27.7	3.67	0.957 7279	0.926 1823	0.927 5523
14	62 32 18.3	2 13.01	1 35.8	1 55 13.0	3.68	0.957 6993	0.928 9540	0.930 3851
18	62 41 10.4	2 13.03	1 35.9	1 54 58.2	3.69	0.957 6708	0.931 8431	0.933 3258
22	62 50 2.6	2 13.04	−1 36.0	−1 54 43.4	+3.71	0.957 6425	0.934 8310	0.936 3565
26	62 58 54.8	2 13.06	1 36.1	1 54 28.6	3.72	0.957 6144	0.937 9001	0.939 4598
30	63 7 47.1	2 13.08	1 36.2	1 54 13.7	3.73	0.957 5864	0.941 0334	0.942 6188
Feb. 3	63 16 39.4	2 13.09	1 36.3	1 53 58.8	3.74	0.957 5585	0.944 2136	0.945 8158
7	63 25 31.8	2 13.11	1 36.4	1 53 43.8	3.76	0.957 5307	0.947 4232	0.949 0336
11	63 34 24.3	2 13.13	−1 36.4	−1 53 28.7	+3.77	0.957 5031	0.950 6447	0.952 2545
15	63 43 16.8	2 13.14	1 36.5	1 53 13.6	3.78	0.957 4756	0.953 8611	0.955 4627
19	63 52 9.4	2 13.16	1 36.6	1 52 58.5	3.79	0.957 4483	0.957 0576	0.958 6440
23	64 1 2.1	2 13.18	1 36.7	1 52 43.3	3.80	0.957 4211	0.960 2204	0.961 7853
27	64 9 54.8	2 13.19	1 36.7	1 52 28.1	3.81	0.957 3940	0.963 3372	0.964 8746
Mar. 3	64 18 47.6	2 13.21	−1 36.8	−1 52 12.8	+3.82	0.957 3670	0.966 3959	0.967 8997
7	64 27 40.5	2 13.23	1 36.8	1 51 57.5	3.84	0.957 3402	0.969 3844	0.970 8486
11	64 36 33.5	2 13.24	1 36.9	1 51 42.1	3.85	0.957 3135	0.972 2909	0.973 7100
15	64 45 26.5	2 13.26	1 37.0	1 51 26.7	3.86	0.957 2869	0.975 1047	0.976 4738
19	64 54 19.5	2 13.27	1 37.0	1 51 11.2	3.87	0.957 2605	0.977 8164	0.979 1315
23	65 3 12.6	2 13.29	−1 37.1	−1 50 55.7	+3.88	0.957 2342	0.980 4185	0.981 6765
27	65 12 5.8	2 13.31	1 37.2	1 50 40.1	3.89	0.957 2081	0.982 9046	0.984 1020
31	65 20 59.1	2 13.32	1 37.2	1 50 24.5	3.91	0.957 1821	0.985 2678	0.986 4012
Apr. 4	65 29 52.4	2 13.34	1 37.3	1 50 8.9	3.92	0.957 1563	0.987 5013	0.988 5674
8	65 38 45.8	2 13.35	1 37.3	1 49 53.2	3.93	0.957 1306	0.989 5988	0.990 5946
12	65 47 39.2	2 13.36	−1 37.3	−1 49 37.4	+3.94	0.957 1050	0.991 5543	0.992 4774
16	65 56 32.7	2 13.38	1 37.4	1 49 21.6	3.95	0.957 0796	0.993 3636	0.994 2125
20	66 5 26.3	2 13.40	1 37.4	1 49 5.8	3.96	0.957 0543	0.995 0237	0.995 7970
24	66 14 19.9	2 13.41	1 37.4	1 48 49.9	3.97	0.957 0291	0.996 5321	0.997 2286
28	66 23 13.6	2 13.43	1 37.4	1 48 34.0	3.98	0.957 0041	0.997 8860	0.998 5040
May 2	66 32 7.3	2 13.44	−1 37.5	−1 48 18.1	+4.00	0.956 9792	0.999 0823	0.999 6204
6	66 41 1.1	2 13.46	1 37.5	1 48 2.1	4.01	0.956 9545	1.000 1180	1.000 5749
10	66 49 55.0	2 13.47	1 37.5	1 47 46.0	4.02	0.956 9299	1.000 9909	1.001 3659
14	66 58 48.9	2 13.49	1 37.5	1 47 29.9	4.03	0.956 9055	1.001 6998	1.001 9926
18	67 7 42.9	2 13.50	1 37.5	1 47 13.7	4.04	0.956 8812	1.002 2443	1.002 4549
22	67 16 36.9	2 13.52	−1 37.5	−1 46 57.5	+4.05	0.956 8570	1.002 6244	1.002 7529
26	67 25 31.0	2 13.53	1 37.5	1 46 41.3	4.07	0.956 8330	1.002 8402	1.002 8863
30	67 34 25.2	2 13.54	1 37.5	1 46 25.0	4.08	0.956 8091	1.002 8910	1.002 8542
June 3	67 43 19.4	2 13.56	1 37.5	1 46 8.7	4.09	0.956 7853	1.002 7758	1.002 6560
7	67 52 13.7	2 13.57	1 37.6	1 45 52.3	4.10	0.956 7617	1.002 4948	1.002 2923
11	68 1 8.0	2 13.59	−1 37.6	−1 45 35.9	+4.11	0.956 7382	1.002 0488	1.001 7646
15	68 10 2.4	2 13.60	1 37.6	1 45 19.4	4.12	0.956 7149	1.001 4400	1.001 0751
19	68 18 56.8	2 13.62	1 37.5	1 45 2.9	4.13	0.956 6917	1.000 6702	1.000 2255
23	68 27 51.3	2 13.63	1 37.5	1 44 46.4	4.14	0.956 6687	0.999 7412	0.999 2173
27	68 36 45.8	2 13.64	1 37.5	1 44 29.8	4.15	0.956 6458	0.998 6541	0.998 0517
July 1	68 45 40.4	2 13.66	−1 37.5	−1 44 13.1	+4.16	0.956 6231	0.997 4104	0.996 7304
5	68 54 35.1	2 13.67	−1 37.5	−1 43 56.4	+4.18	0.956 6005	0.996 0122	0.995 2561

SATURN.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	′ ″	′ ″	° ′ ″	″			
July 1	68 45 40.4	2 13.66	−1 37.5	−1 44 13.1	+4.16	0.956 6231	0.997 4104	0.996 7304
5	68 54 35.1	2 13.67	1 37.5	1 43 56.4	4.18	0.956 6005	0.996 0122	0.995 2561
9	69 3 29.8	2 13.69	1 37.5	1 43 39.7	4.19	0.956 5781	0.994 4625	0.993 6321
13	69 12 24.6	2 13.70	1 37.5	1 43 23.0	4.20	0.956 5558	0.992 7656	0.991 8634
17	69 21 19.4	2 13.72	1 37.4	1 43 6.2	4.21	0.956 5336	0.990 9259	0.989 9538
21	69 30 14.3	2 13.73	−1 37.4	−1 42 49.3	+4.22	0.956 5115	0.988 9474	0.987 9072
25	69 39 9.3	2 13.74	1 37.3	1 42 32.4	4.23	0.956 4896	0.986 8336	0.985 7274
29	69 48 4.3	2 13.75	1 37.3	1 42 15.4	4.24	0.956 4678	0.984 5890	0.983 4190
Aug. 2	69 56 59.3	2 13.77	1 37.3	1 41 58.4	4.25	0.956 4462	0.982 2182	0.980 9875
6	70 5 54.4	2 13.78	1 37.2	1 41 41.4	4.26	0.956 4247	0.979 7279	0.978 4403
10	70 14 49.5	2 13.79	−1 37.2	−1 41 24.3	+4.27	0.956 4033	0.977 1257	0.975 7850
14	70 23 44.7	2 13.81	1 37.1	1 41 7.2	4.28	0.956 3821	0.974 4193	0.973 0294
18	70 32 40.0	2 13.82	1 37.1	1 40 50.0	4.29	0.956 3610	0.971 6164	0.970 1812
22	70 41 35.3	2 13.83	1 37.0	1 40 32.8	4.30	0.956 3401	0.968 7248	0.967 2482
26	70 50 30.7	2 13.85	1 37.0	1 40 15.6	4.31	0.956 3193	0.965 7526	0.964 2392
30	70 59 26.1	2 13.86	−1 36.9	−1 39 58.3	+4.32	0.956 2986	0.962 7093	0.961 1644
Sept. 3	71 8 21.6	2 13.87	1 36.9	1 39 41.0	4.33	0.956 2782	0.959 6061	0.958 0361
7	71 17 17.1	2 13.89	1 36.9	1 39 23.7	4.34	0.956 2579	0.956 4560	0.954 8673
11	71 26 12.7	2 13.90	1 36.8	1 39 6.3	4.36	0.956 2377	0.953 2715	0.951 6703
15	71 35 8.3	2 13.91	1 36.7	1 38 48.8	4.37	0.956 2177	0.950 0652	0.948 4579
19	71 44 3.9	2 13.92	−1 36.7	−1 38 31.3	+4.38	0.956 1978	0.946 8502	0.945 2438
23	71 52 59.6	2 13.93	1 36.6	1 38 13.8	4.39	0.956 1781	0.943 6405	0.942 0422
27	72 1 55.4	2 13.95	1 36.5	1 37 56.2	4.40	0.956 1585	0.940 4509	0.938 8686
Oct. 1	72 10 51.2	2 13.96	1 36.4	1 37 38.6	4.41	0.956 1390	0.937 2977	0.935 7406
5	72 19 47.0	2 13.97	1 36.4	1 37 20.9	4.42	0.956 1196	0.934 1993	0.932 6762
9	72 28 42.9	2 13.98	−1 36.3	−1 37 3.2	+4.43	0.956 1004	0.931 1733	0.929 6926
13	72 37 38.9	2 13.99	1 36.2	1 36 45.5	4.44	0.956 0814	0.928 2363	0.926 8067
17	72 46 34.9	2 14.00	1 36.1	1 36 27.7	4.45	0.956 0625	0.925 4058	0.924 0358
21	72 55 30.9	2 14.01	1 36.1	1 36 9.9	4.46	0.956 0437	0.922 6988	0.921 3969
25	73 4 27.0	2 14.03	1 36.0	1 35 52.0	4.47	0.956 0251	0.920 1325	0.918 9080
29	73 13 23.1	2 14.04	−1 35.9	−1 35 34.1	+4.48	0.956 0066	0.917 7259	0.916 5884
Nov. 2	73 22 19.3	2 14.05	1 35.8	1 35 16.2	4.49	0.955 9884	0.915 4975	0.914 4554
6	73 31 15.5	2 14.06	1 35.7	1 34 58.2	4.50	0.955 9703	0.913 4640	0.912 5250
10	73 40 11.8	2 14.07	1 35.6	1 34 40.2	4.51	0.955 9523	0.911 6403	0.910 8114
14	73 49 8.1	2 14.08	1 35.5	1 34 22.1	4.52	0.955 9344	0.910 0397	0.909 3269
18	73 58 4.5	2 14.09	−1 35.4	−1 34 4.0	+4.53	0.955 9167	0.908 6744	0.908 0838
22	74 7 0.9	2 14.10	1 35.3	1 33 45.9	4.54	0.955 8991	0.907 5562	0.907 0929
26	74 15 57.3	2 14.11	1 35.2	1 33 27.7	4.55	0.955 8817	0.906 6951	0.906 3640
30	74 24 53.8	2 14.13	1 35.1	1 33 9.5	4.56	0.955 8644	0.906 1003	0.905 9046
Dec. 4	74 33 50.3	2 14.14	1 35.0	1 32 51.2	4.57	0.955 8473	0.905 7772	0.905 7183
8	74 42 46.9	2 14.15	−1 34.9	−1 32 32.9	+4.58	0.955 8303	0.905 7280	0.905 8061
12	74 51 43.5	2 14.16	1 34.8	1 32 14.6	4.59	0.955 8135	0.905 9524	0.906 1666
16	75 0 40.1	2 14.17	1 34.6	1 31 56.2	4.60	0.955 7968	0.906 4483	0.906 7969
20	75 9 36.8	2 14.18	1 34.5	1 31 37.8	4.61	0.955 7803	0.907 2119	0.907 6926
24	75 18 33.5	2 14.19	1 34.3	1 31 19.3	4.62	0.955 7639	0.908 2383	0.908 8480
28	75 27 30.3	2 14.20	−1 34.2	−1 31 0.8	+4.63	0.955 7476	0.909 5203	0.910 2538
32	75 36 27.1	2 14.21	−1 34.0	−1 30 42.3	+4.64	0.955 7315	0.911 0469	0.911 8980

URANUS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	″	″	° ′ ″	″			
Jan. 6	303 18 49.3	39.83	+9.3	−0 35 21.2	−0.35	1.296 6561	1.316 7749	1.317 1628
14	303 24 7.9	39.83	9.3	0 35 24.0	0.35	1.296 6800	1.317 4571	1.317 6569
22	303 29 26.5	39.82	9.3	0 35 26.7	0.35	1.296 7038	1.317 7621	1.317 7728
30	303 34 45.1	39.82	9.2	0 35 29.5	0.34	1.296 7276	1.317 6890	1.317 5107
Feb. 7	303 40 3.7	39.82	9.2	0 35 32.3	0.34	1.296 7513	1.317 2384	1.316 8733
15	303 45 22.2	39.81	+9.2	−0 35 35.0	−0.34	1.296 7750	1.316 4173	1.315 8728
23	303 50 40.7	39.81	9.2	0 35 37.8	0.34	1.296 7986	1.315 2420	1.314 5274
Mar. 3	303 55 59.2	39.81	9.2	0 35 40.5	0.34	1.296 8222	1.313 7314	1.312 8569
11	304 1 17.6	39.80	9.2	0 35 43.3	0.34	1.296 8458	1.311 9075	1.310 8874
19	304 6 36.0	39.80	9.2	0 35 46.0	0.34	1.296 8694	1.309 8010	1.308 6529
27	304 11 54.4	39.80	+9.2	−0 35 48.7	−0.34	1.296 8930	1.307 4476	1.306 1895
Apr. 4	304 17 12.7	39.79	9.2	0 35 51.5	0.34	1.296 9165	1.304 8837	1.303 5356
12	304 22 31.0	39.79	9.2	0 35 54.2	0.34	1.296 9399	1.302 1515	1.300 7376
20	304 27 49.3	39.78	9.2	0 35 56.9	0.34	1.296 9633	1.299 3000	1.297 8447
28	304 33 7.6	39.78	9.2	0 35 59.6	0.34	1.296 9866	1.296 3778	1.294 9057
May 6	304 38 25.8	39.78	+9.2	−0 36 2.3	−0.34	1.297 0099	1.293 4353	1.291 9738
14	304 43 44.0	39.77	9.2	0 36 5.0	0.34	1.297 0331	1.290 5285	1.289 1062
22	304 49 2.1	39.77	9.1	0 36 7.7	0.34	1.297 0562	1.287 7134	1.286 3566
30	304 54 20.2	39.76	9.1	0 36 10.4	0.34	1.297 0793	1.285 0424	1.283 7778
June 7	304 59 38.3	39.76	9.1	0 36 13.0	0.34	1.297 1024	1.282 5696	1.281 4244
15	305 4 56.4	39.75	+9.1	−0 36 15.7	−0.33	1.297 1254	1.280 3484	1.279 3471
23	305 10 14.4	39.75	9.1	0 36 18.4	0.33	1.297 1484	1.278 4255	1.277 5885
July 1	305 15 32.4	39.74	9.1	0 36 21.1	0.33	1.297 1714	1.276 8411	1.276 1881
9	305 20 50.4	39.74	9.1	0 36 23.7	0.33	1.297 1943	1.275 6336	1.275 1808
17	305 26 8.3	39.74	9.1	0 36 26.4	0.33	1.297 2171	1.274 8319	1.274 5887
25	305 31 26.2	39.73	+9.1	−0 36 29.0	−0.33	1.297 2399	1.274 4527	1.274 4253
Aug. 2	305 36 44.0	39.73	9.1	0 36 31.6	0.33	1.297 2627	1.274 5074	1.274 6989
10	305 42 1.9	39.73	9.1	0 36 34.3	0.33	1.297 2854	1.274 9986	1.275 4045
18	305 47 19.7	39.72	9.1	0 36 36.9	0.33	1.297 3080	1.275 9144	1.276 5254
26	305 52 37.4	39.72	9.1	0 36 39.6	0.33	1.297 3306	1.277 2348	1.278 0393
Sept. 3	305 57 55.2	39.72	+9.1	−0 36 42.2	−0.33	1.297 3532	1.278 9344	1.279 9150
11	306 3 12.9	39.71	9.1	0 36 44.8	0.33	1.297 3757	1.280 9756	1.282 1103
19	306 8 30.6	39.71	9.1	0 36 47.4	0.33	1.297 3982	1.283 3133	1.284 5785
27	306 13 48.2	39.70	9.0	0 36 50.0	0.32	1.297 4206	1.285 8998	1.287 2706
Oct. 5	306 19 5.8	39.70	9.0	0 36 52.6	0.32	1.297 4430	1.288 6834	1.290 1304
13	306 24 23.4	39.70	+9.0	−0 36 55.2	−0.32	1.297 4653	1.291 6044	1.293 0985
21	306 29 41.0	39.69	9.0	0 36 57.8	0.32	1.297 4876	1.294 6058	1.296 1196
29	306 34 58.5	39.69	9.0	0 37 0.4	0.32	1.297 5098	1.297 6324	1.299 1369
Nov. 6	306 40 16.0	39.68	9.0	0 37 2.9	0.32	1.297 5320	1.300 6257	1.302 0920
14	306 45 33.4	39.68	9.0	0 37 5.5	0.32	1.297 5541	1.303 5296	1.304 9327
22	306 50 50.9	39.68	+9.0	−0 37 8.1	−0.32	1.297 5762	1.306 2952	1.307 6114
30	306 56 8.3	39.67	9.0	0 37 10.6	0.32	1.297 5982	1.308 8753	1.310 0812
Dec. 8	307 1 25.6	39.67	9.0	0 37 13.2	0.32	1.297 6202	1.311 2244	1.312 3004
16	307 6 43.0	39.66	9.0	0 37 15.8	0.32	1.297 6421	1.313 3054	1.314 2356
24	307 12 0.3	39.66	9.0	0 37 18.3	0.32	1.297 6640	1.315 0873	1.315 8569
32	307 17 17.5	39.66	+8.9	−0 37 20.8	−0.32	1.297 6858	1.316 5412	1.317 1377
40	307 22 34.8	39.65	+8.9	−0 37 23.4	−0.32	1.297 7075	1.317 6447	1.318 0608

NEPTUNE.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	″	″	° ′ ″	″			
Jan. 6	114 34 5.0	21.75	−26.7	−0 29 52.9	+0.65	1.476 8307	1.462 5345	1.462 4041
14	114 36 59.0	21.75	26.6	0 29 47.7	0.65	1.476 8336	1.462 3486	1.462 3680
22	114 39 53.0	21.75	26.6	0 29 42.5	0.65	1.476 8365	1.462 4617	1.462 6291
30	114 42 47.0	21.75	26.5	0 29 37.4	0.65	1.476 8393	1.462 8695	1.463 1814
Feb. 7	114 45 40.9	21.75	26.4	0 29 32.2	0.65	1.476 8421	1.463 5632	1.464 0124
15	114 48 34.9	21.75	−26.3	−0 29 27.0	+0.65	1.476 8449	1.464 5260	1.465 1006
23	114 51 28.9	21.75	26.3	0 29 21.8	0.65	1.476 8477	1.465 7329	1.466 4192
Mar. 3	114 54 22.9	21.75	26.2	0 29 16.7	0.65	1.476 8505	1.467 1559	1.467 9391
11	114 57 16.8	21.75	26.1	0 29 11.5	0.65	1.476 8533	1.468 7643	1.469 6266
19	115 0 10.8	21.74	26.0	0 29 6.3	0.65	1.476 8561	1.470 5212	1.471 4432
27	115 3 4.7	21.74	−26.0	−0 29 1.1	+0.65	1.476 8590	1.472 3882	1.473 3516
Apr. 4	115 5 58.7	21.74	25.9	0 28 56.0	0.65	1.476 8618	1.474 3286	1.475 3145
12	115 8 52.6	21.74	25.8	0 28 50.8	0.65	1.476 8647	1.476 3042	1.477 2927
20	115 11 46.6	21.74	25.8	0 28 45.6	0.65	1.476 8675	1.478 2756	1.479 2487
28	115 14 40.5	21.74	25.7	0 28 40.4	0.65	1.476 8704	1.480 2080	1.481 1494
May 6	115 17 34.4	21.74	−25.6	−0 28 35.2	+0.65	1.476 8732	1.482 0687	1.482 9618
14	115 20 28.4	21.74	25.6	0 28 30.1	0.65	1.476 8761	1.483 8249	1.484 6546
22	115 23 22.3	21.74	25.5	0 28 24.9	0.65	1.476 8790	1.485 4479	1.486 2019
30	115 26 16.2	21.74	25.4	0 28 19.7	0.65	1.476 8819	1.486 9137	1.487 5804
June 7	115 29 10.2	21.74	25.3	0 28 14.5	0.65	1.476 8848	1.488 1994	1.488 7682
15	115 32 4.1	21.74	−25.3	−0 28 9.3	+0.65	1.476 8877	1.489 2849	1.489 7479
23	115 34 58.0	21.74	25.2	0 28 4.1	0.65	1.476 8906	1.490 1557	1.490 5069
July 1	115 37 51.9	21.74	25.1	0 27 58.9	0.65	1.476 8936	1.490 8000	1.491 0335
9	115 40 45.9	21.74	25.0	0 27 53.7	0.65	1.476 8965	1.491 2067	1.491 3190
17	115 43 39.8	21.74	25.0	0 27 48.6	0.65	1.476 8994	1.491 3702	1.491 3605
25	115 46 33.7	21.74	−24.9	−0 27 43.4	+0.65	1.476 9024	1.491 2898	1.491 1579
Aug. 2	115 49 27.6	21.74	24.8	0 27 38.2	0.65	1.476 9053	1.490 9649	1.490 7114
10	115 52 21.5	21.74	24.8	0 27 33.0	0.65	1.476 9083	1.490 3985	1.490 0277
18	115 55 15.4	21.74	24.7	0 27 27.8	0.65	1.476 9113	1.489 6001	1.489 1171
26	115 58 9.3	21.74	24.6	0 27 22.6	0.65	1.476 9143	1.488 5803	1.487 9913
Sept. 3	116 1 3.2	21.74	−24.5	−0 27 17.4	+0.65	1.476 9173	1.487 3522	1.486 6656
11	116 3 57.1	21.74	24.5	0 27 12.2	0.65	1.476 9203	1.485 9344	1.485 1615
19	116 6 51.0	21.74	24.4	0 27 7.0	0.65	1.476 9233	1.484 3497	1.483 5020
27	116 9 44.9	21.74	24.3	0 27 1.8	0.65	1.476 9263	1.482 6216	1.481 7122
Oct. 5	116 12 38.7	21.74	24.3	0 26 56.6	0.65	1.476 9294	1.480 7779	1.479 8229
13	116 15 32.6	21.73	−24.2	−0 26 51.4	+0.65	1.476 9324	1.478 8516	1.477 8682
21	116 18 26.5	21.73	24.1	0 26 46.2	0.65	1.476 9354	1.476 8768	1.475 8819
29	116 21 20.4	21.73	24.0	0 26 41.0	0.65	1.476 9385	1.474 8885	1.473 9016
Nov. 6	116 24 14.2	21.73	24.0	0 26 35.8	0.65	1.476 9416	1.472 9263	1.471 9677
14	116 27 8.1	21.73	23.9	0 26 30.6	0.65	1.476 9446	1.471 0304	1.470 1192
22	116 30 2.0	21.73	−23.8	−0 26 25.4	+0.65	1.476 9477	1.469 2388	1.468 3940
30	116 32 55.9	21.73	23.7	0 26 20.2	0.65	1.476 9508	1.467 5898	1.466 8311
Dec. 8	116 35 49.7	21.73	23.7	0 26 15.0	0.65	1.476 9539	1.466 1220	1.465 4664
16	116 38 43.6	21.73	23.6	0 26 9.8	0.65	1.476 9570	1.464 8680	1.464 3299
24	116 41 37.4	21.73	23.5	0 26 4.5	0.65	1.476 9601	1.463 8555	1.463 4481
32	116 44 31.3	21.73	−23.4	−0 25 59.3	+0.65	1.476 9632	1.463 1102	1.462 8437
40	116 47 25.2	21.73	−23.4	−0 25 54.1	+0.65	1.476 9664	1.462 6500	1.462 5300

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Jan. 1	+0.179 2378	+0.187 8326	+ 80	−0.886 8932	−0.885 3963	−145	−0.384 7678	−0.384 1188	+372
2	0.196 4133	0.204 9790	71	0.883 8303	0.882 1953	145	0.383 4398	0.382 7307	371
3	0.213 5289	0.222 0624	61	0.880 4913	0.878 7185	146	0.381 9917	0.381 2228	370
4	0.230 5788	0.239 0774	52	0.876 8769	0.874 9667	146	0.380 4240	0.379 5954	368
5	0.247 5575	0.256 0184	43	0.872 9881	0.870 9412	147	0.378 7372	0.377 8493	366
6	+0.264 4593	+0.272 8796	+ 34	−0.868 8262	−0.866 6433	−148	−0.376 9319	−0.375 9849	+364
7	0.281 2786	0.289 6557	25	0.864 3926	0.862 0744	149	0.375 0085	0.374 0027	362
8	0.298 0101	0.306 3411	16	0.859 6888	0.857 2360	150	0.372 9677	0.371 9035	360
9	0.314 6480	0.322 9302	+ 7	0.854 7162	0.852 1297	152	0.370 8102	0.369 6878	357
10	0.331 1869	0.339 4176	− 1	0.849 4766	0.846 7573	154	0.368 5366	0.367 3567	354
11	+0.347 6216	+0.355 7983	− 10	−0.843 9719	−0.841 1208	−156	−0.366 1481	−0.364 9109	+351
12	0.363 9469	0.372 0668	18	0.838 2042	0.835 2223	158	0.363 6453	0.362 3514	347
13	0.380 1574	0.388 2181	26	0.832 1754	0.829 0638	161	0.361 0292	0.359 6790	344
14	0.396 2482	0.404 2471	34	0.825 8878	0.822 6476	164	0.358 3008	0.356 8948	340
15	0.412 2143	0.420 1491	42	0.819 3436	0.815 9760	167	0.355 4611	0.353 9999	336
16	+0.428 0508	+0.435 9189	− 49	−0.812 5451	−0.809 0513	−170	−0.352 5112	−0.350 9953	+332
17	0.443 7529	0.451 5522	56	0.805 4949	0.801 8762	173	0.349 4522	0.347 8821	328
18	0.459 3161	0.467 0441	63	0.798 1956	0.794 4533	177	0.346 2851	0.344 6614	324
19	0.474 7357	0.482 3903	70	0.790 6496	0.786 7849	181	0.343 0111	0.341 3344	319
20	0.490 0073	0.497 5863	77	0.782 8595	0.778 8736	185	0.339 6314	0.337 9023	314
21	+0.505 1268	+0.512 6282	− 84	−0.774 8277	−0.770 7220	−189	−0.336 1471	−0.334 3660	+309
22	0.520 0899	0.527 5115	90	0.766 5569	0.762 3326	193	0.332 5592	0.330 7268	304
23	0.534 8925	0.542 2323	96	0.758 0495	0.753 7080	197	0.328 8689	0.326 9857	299
24	0.549 5305	0.556 7864	102	0.749 3083	0.744 8506	202	0.325 0772	0.323 1436	294
25	0.563 9996	0.571 1695	108	0.740 3353	0.735 7628	207	0.321 1851	0.319 2017	288
26	+0.578 2956	+0.585 3773	−113	−0.731 1333	−0.726 4471	−212	−0.317 1936	−0.315 1609	+282
27	0.592 4141	0.599 4054	118	0.721 7046	0.716 9062	217	0.313 1038	0.311 0225	276
28	0.606 3508	0.613 2496	122	0.712 0521	0.707 1427	222	0.308 9170	0.306 7874	270
29	0.620 1013	0.626 9052	127	0.702 1783	0.697 1593	227	0.304 6340	0.302 4569	264
30	0.633 6609	0.640 3679	131	0.692 0861	0.686 9590	232	0.300 2562	0.298 0322	257
31	+0.647 0255	+0.653 6332	−135	−0.681 7785	−0.676 5450	−237	−0.295 7850	−0.293 5147	+250
Feb. 1	0.660 1904	0.666 6967	139	0.671 2588	0.665 9204	243	0.291 2215	0.288 9056	243
2	0.673 1515	0.679 5544	142	0.660 5302	0.655 0887	248	0.286 5672	0.284 2065	236
3	0.685 9047	0.692 2020	145	0.649 5962	0.644 0533	253	0.281 8236	0.279 4188	229
4	0.698 4457	0.704 6353	148	0.638 4603	0.632 8178	258	0.276 9923	0.274 5443	222
5	+0.710 7703	+0.716 8502	−150	−0.627 1261	−0.621 3858	−264	−0.272 0749	−0.269 5844	+214
6	0.722 8746	0.728 8430	152	0.615 5973	0.609 7612	269	0.267 0729	0.264 5407	206
7	0.734 7549	0.740 6099	154	0.603 8779	0.597 9479	274	0.261 9881	0.259 4152	198
8	0.746 4074	0.752 1470	156	0.591 9717	0.585 9498	280	0.256 8223	0.254 2095	190
9	0.757 8283	0.763 4510	157	0.579 8828	0.573 7711	285	0.251 5771	0.248 9253	182
10	+0.769 0146	+0.774 5186	−158	−0.567 6152	−0.561 4157	−290	−0.246 2543	−0.243 5644	+174
11	0.779 9627	0.785 3465	158	0.555 1731	0.548 8879	296	0.240 8558	0.238 1288	166
12	0.790 6696	0.795 9315	159	0.542 5607	0.536 1920	301	0.235 3835	0.232 6202	158
13	0.801 1319	0.806 2705	159	0.529 7823	0.523 3322	306	0.229 8392	0.227 0406	149
14	0.811 3470	0.816 3609	159	0.516 8421	0.510 3127	312	0.224 2248	0.221 3919	141
15	+0.821 3120	+0.826 1999	−158	−0.503 7444	−0.497 1379	−317	−0.218 5422	−0.215 6760	+132
16	+0.831 0244	+0.835 7852	−158	−0.490 4936	−0.483 8121	−322	−0.212 7934	−0.209 8947	+123

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. o.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Feb. 16	+0.831 0244	+0.835 7852	−158	−0.490 4936	−0.483 8121	−322	−0.212 7934	−0.209 8947	+123
17	0.840 4819	0.845 1143	157	0.477 0939	0.470 3395	327	0.206 9802	0.204 0499	114
18	0.849 6820	0.854 1848	156	0.463 5495	0.456 7243	332	0.201 1043	0.198 1434	105
19	0.858 6224	0.862 9946	154	0.449 8645	0.442 9706	337	0.195 1676	0.192 1770	96
20	0.867 3012	0.871 5418	153	0.436 0432	0.429 0827	342	0.189 1719	0.186 1525	87
21	+0.875 7162	+0.879 8241	−151	−0.422 0896	−0.415 0644	−347	−0.183 1189	−0.180 0714	+ 77
22	0.883 8652	0.887 8393	149	0.408 0075	0.400 9195	352	0.177 0102	0.173 9355	68
23	0.891 7461	0.895 5853	147	0.393 8009	0.386 6522	357	0.170 8475	0.167 7465	58
24	0.899 3566	0.903 0597	144	0.379 4740	0.372 2666	362	0.164 6326	0.161 5060	49
25	0.906 6943	0.910 2602	141	0.365 0306	0.357 7666	366	0.158 3671	0.155 2160	39
26	+0.913 7570	+0.917 1846	−138	−0.350 4750	−0.343 1565	−371	−0.152 0530	−0.148 8782	+ 30
27	0.920 5426	0.923 8307	134	0.335 8116	0.328 4408	375	0.145 6919	0.142 4943	20
28	0.927 0487	0.930 1962	130	0.321 0447	0.313 6238	379	0.139 2857	0.136 0663	11
Mar. 1	0.933 2730	0.936 2790	126	0.306 1788	0.298 7101	383	0.132 8364	0.129 5962	+ 1
2	0.939 2138	0.942 0772	122	0.291 2184	0.283 7043	387	0.126 3460	0.123 0860	− 8
3	+0.944 8691	+0.947 5891	−117	−0.276 1683	−0.268 6111	−391	−0.119 8165	−0.116 5377	− 18
4	0.950 2371	0.952 8128	112	0.261 0332	0.253 4352	395	0.113 2500	0.109 9535	28
5	0.955 3160	0.957 7466	107	0.245 8178	0.238 1817	399	0.106 6486	0.103 3354	38
6	0.960 1044	0.962 3893	102	0.230 5273	0.222 8553	403	0.100 0143	0.096 6855	48
7	0.964 6010	0.966 7394	97	0.215 1662	0.207 4608	407	0.093 3494	0.090 0062	58
8	+0.968 8043	+0.970 7956	− 91	−0.199 7396	−0.192 0033	−410	−0.086 6561	−0.083 2995	− 68
9	0.972 7132	0.974 5570	85	0.184 2524	0.176 4877	413	0.079 9365	0.076 5675	78
10	0.976 3269	0.978 0229	79	0.168 7097	0.160 9191	416	0.073 1927	0.069 8124	88
11	0.979 6451	0.981 1925	73	0.153 1165	0.145 3025	419	0.066 4270	0.063 0366	98
12	0.982 6661	0.984 0650	66	0.137 4778	0.129 6429	422	0.059 6417	0.056 2423	108
13	+0.985 3897	+0.986 6399	− 59	−0.121 7986	−0.113 9453	−425	−0.052 8389	−0.049 4317	−118
14	0.987 8157	0.988 9171	52	0.106 0838	0.098 2147	428	0.046 0209	0.042 6068	128
15	0.989 9440	0.990 8964	45	0.090 3385	0.082 4559	431	0.039 1897	0.035 7698	138
16	0.991 7744	0.992 5780	38	0.074 5675	0.066 6738	434	0.032 3475	0.028 9229	148
17	0.993 3072	0.993 9621	30	0.058 7755	0.050 8732	436	0.025 4964	0.022 0682	157
18	+0.994 5426	+0.995 0487	− 22	−0.042 9675	−0.035 0589	−438	−0.018 6385	−0.015 2076	−167
19	0.995 4805	0.995 8380	14	0.027 1480	0.019 2353	440	0.011 7758	0.008 3432	177
20	0.996 1214	0.996 3308	− 6	−0.011 3214	−0.003 4068	442	−0.004 9101	−0.001 4768	187
21	0.996 4661	0.996 5273	+ 2	+0.004 5078	+0.012 4220	444	+0.001 9566	+0.005 3898	196
22	0.996 5145	0.996 4277	10	0.020 3352	0.028 2470	446	0.008 8225	0.012 2546	206
23	+0.996 2669	+0.996 0322	+ 19	+0.036 1568	+0.044 0639	−448	+0.015 6858	+0.019 1159	−215
24	0.995 7236	0.995 3411	28	0.051 9679	0.059 8682	449	0.022 5446	0.025 9718	224
25	0.994 8848	0.994 3547	37	0.067 7642	0.075 6555	450	0.029 3971	0.032 8205	233
26	0.993 7508	0.993 0731	46	0.083 5415	0.091 4216	451	0.036 2415	0.039 6600	242
27	0.992 3217	0.991 4967	56	0.099 2952	0.107 1618	452	0.043 0757	0.046 4884	251
28	+0.990 5980	+0.989 6256	+ 65	+0.115 0207	+0.122 8714	−453	+0.049 8978	+0.053 3037	−260
29	0.988 5797	0.987 4603	75	0.130 7134	0.138 5461	453	0.056 7059	0.060 1041	269
30	0.986 2675	0.985 0016	85	0.146 3688	0.154 1809	454	0.063 4980	0.066 8874	278
31	0.983 6625	0.982 2503	95	0.161 9818	0.169 7711	454	0.070 2719	0.073 6514	287
Apr. 1	0.980 7651	0.979 2070	105	0.177 5480	0.185 3121	455	0.077 0255	0.080 3941	296
2	+0.977 5761	+0.975 8724	+116	+0.193 0627	+0.200 7990	−455	+0.083 7568	+0.087 1135	−305
3	+0.974 0962	+0.972 2477	+126	+0.208 5207	+0.216 2271	−455	+0.090 4638	+0.093 8075	−314

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Apr. 1	+0.980 7651	+0.979 2070	+105	+0.177 5480	+0.185 3121	−455	+0.077 0255	+0.080 3941	−296
2	0.977 5761	0.975 8724	116	0.193 0627	0.200 7990	455	0.083 7568	0.087 1135	305
3	0.974 0962	0.972 2477	126	0.208 5207	0.216 2271	455	0.090 4638	0.093 8075	314
4	0.970 3270	0.968 3343	137	0.223 9176	0.231 5917	455	0.097 1443	0.100 4740	323
5	0.966 2698	0.964 1335	148	0.239 2487	0.246 8881	455	0.103 7962	0.107 1108	331
6	+0.961 9258	+0.959 6468	+159	+0.254 5092	+0.262 1115	−455	+0.110 4174	+0.113 7159	−339
7	0.957 2967	0.954 8757	170	0.269 6943	0.277 2571	454	0.117 0060	0.120 2873	347
8	0.952 3841	0.949 8220	181	0.284 7992	0.292 3202	454	0.123 5597	0.126 8229	355
9	0.947 1898	0.944 4876	193	0.299 8194	0.307 2964	453	0.130 0766	0.133 3206	363
10	0.941 7158	0.938 8746	205	0.314 7506	0.322 1812	452	0.136 5547	0.139 7786	370
11	+0.935 9644	+0.932 9853	+217	+0.329 5878	+0.336 9698	−451	+0.142 9920	+0.146 1947	−377
12	0.929 9377	0.926 8219	229	0.344 3267	0.351 6580	449	0.149 3864	0.152 5670	384
13	0.923 6382	0.920 3869	240	0.358 9631	0.366 2415	447	0.155 7361	0.158 8937	391
14	0.917 0683	0.913 6827	252	0.373 4928	0.380 7164	445	0.162 0394	0.165 1731	398
15	0.910 2305	0.906 7119	264	0.387 9118	0.395 0785	444	0.168 2945	0.171 4034	405
16	+0.903 1274	+0.899 4772	+277	+0.402 2160	+0.409 3239	−442	+0.174 4997	+0.177 5831	−412
17	0.895 7617	0.891 9812	290	0.416 4018	0.423 4492	441	0.180 6534	0.183 7104	419
18	0.888 1360	0.884 2264	303	0.430 4655	0.437 4504	439	0.186 7540	0.189 7839	425
19	0.880 2527	0.876 2152	316	0.444 4033	0.451 3239	437	0.192 7999	0.195 8020	431
20	0.872 1143	0.867 9502	329	0.458 2117	0.465 0663	434	0.198 7898	0.201 7632	437
21	+0.863 7233	+0.859 4338	+342	+0.471 8872	+0.478 6739	−432	+0.204 7221	+0.207 6661	−443
22	0.855 0821	0.850 6685	355	0.485 4261	0.492 1433	430	0.210 5952	0.213 5091	449
23	0.846 1932	0.841 6565	368	0.498 8250	0.505 4708	427	0.216 4077	0.219 2908	455
24	0.837 0588	0.832 4003	382	0.512 0802	0.518 6528	424	0.222 1581	0.225 0094	460
25	0.827 6814	0.822 9024	395	0.525 1881	0.531 6856	421	0.227 8446	0.230 6635	465
26	+0.818 0636	+0.813 1653	+409	+0.538 1449	+0.544 5655	−418	+0.233 4658	+0.236 2513	−470
27	0.808 2079	0.803 1918	422	0.550 9470	0.557 2888	414	0.239 0199	0.241 7713	475
28	0.798 1173	0.792 9848	436	0.563 5905	0.569 8517	410	0.244 5054	0.247 2219	480
29	0.787 7946	0.782 5471	450	0.576 0718	0.582 2504	406	0.249 9207	0.252 6015	484
30	0.777 2426	0.771 8816	464	0.588 3871	0.594 4814	402	0.255 2641	0.257 9083	488
May 1	+0.766 4645	+0.760 9917	+478	+0.600 5328	+0.606 5409	−397	+0.260 5339	+0.263 1407	−492
2	0.755 4635	0.749 8804	492	0.612 5052	0.618 4254	392	0.265 7286	0.268 2973	496
3	0.744 2428	0.738 5512	506	0.624 3010	0.630 1315	387	0.270 8467	0.273 3765	499
4	0.732 8060	0.727 0076	521	0.635 9165	0.641 6555	382	0.275 8865	0.278 3766	502
5	0.721 1564	0.715 2530	535	0.647 3481	0.652 9939	377	0.280 8465	0.283 2961	505
6	+0.709 2977	+0.703 2911	+550	+0.658 5924	+0.664 1432	−372	+0.285 7251	+0.288 1335	−508
7	0.697 2337	0.691 1259	565	0.669 6459	0.675 1001	366	0.290 5210	0.292 8874	511
8	0.684 9682	0.678 7612	580	0.680 5054	0.685 8615	360	0.295 2325	0.297 5562	513
9	0.672 5053	0.666 2011	595	0.691 1680	0.696 4245	354	0.299 8583	0.302 1387	515
10	0.659 8491	0.653 4498	610	0.701 6306	0.706 7859	348	0.304 3972	0.306 6337	517
11	+0.647 0038	+0.640 5115	+625	+0.711 8902	+0.716 9431	−342	+0.308 8480	+0.311 0400	−519
12	0.633 9734	0.627 3902	640	0.721 9442	0.726 8932	335	0.313 2094	0.315 3562	521
13	0.620 7624	0.614 0904	655	0.731 7899	0.736 6339	328	0.317 4802	0.319 5813	522
14	0.607 3749	0.600 6163	670	0.741 4249	0.746 1628	321	0.321 6594	0.323 7145	523
15	0.593 8151	0.586 9718	685	0.750 8471	0.755 4776	314	0.325 7463	0.327 7548	524
16	+0.580 0869	+0.573 1610	+700	+0.760 0541	+0.764 5762	−306	+0.329 7398	+0.331 7012	−525
17	+0.566 1945	+0.559 1880	+715	+0.769 0438	+0.773 4565	−298	+0.333 6390	+0.335 5530	−525

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
May 17	+0.566 1945	+0.559 1880	+ 715	+0.769 0438	+0.773 4565	−298	+0.333 6390	+0.335 5530	−525
18	0.552 1420	0.545 0569	730	0.777 8142	0.782 1165	290	0.337 4432	0.339 3094	525
19	0.537 9332	0.530 7714	745	0.786 3632	0.790 5541	282	0.341 1515	0.342 9694	525
20	0.523 5720	0.516 3354	760	0.794 6888	0.798 7672	273	0.344 7629	0.346 5320	525
21	0.509 0621	0.501 7527	775	0.802 7889	0.806 7537	264	0.348 2766	0.349 9965	524
22	+0.494 4075	+0.487 0271	+ 790	+0.810 6614	+0.814 5117	−255	+0.351 6917	+0.353 3620	−523
23	0.479 6120	0.472 1627	805	0.818 3044	0.822 0391	245	0.355 0074	0.356 6276	522
24	0.464 6796	0.457 1632	820	0.825 7157	0.829 3337	235	0.358 2227	0.359 7924	521
25	0.449 6141	0.442 0328	835	0.832 8930	0.836 3933	225	0.361 3367	0.362 8554	520
26	0.434 4198	0.426 7756	850	0.839 8343	0.843 2159	215	0.364 3485	0.365 8157	518
27	+0.419 1008	+0.411 3959	+ 865	+0.846 5377	+0.849 7995	−204	+0.367 2571	+0.368 6724	−516
28	0.403 6614	0.395 8979	879	0.853 0011	0.856 1422	193	0.370 0616	0.371 4246	514
29	0.388 1059	0.380 2860	894	0.859 2225	0.862 2419	182	0.372 7613	0.374 0715	512
30	0.372 4387	0.364 5646	908	0.865 2001	0.868 0968	170	0.375 3552	0.376 6122	510
31	0.356 6643	0.348 7383	923	0.870 9319	0.873 7051	158	0.377 8424	0.379 0458	507
June 1	+0.340 7872	+0.332 8116	+ 937	+0.876 4162	+0.879 0650	−146	+0.380 2222	+0.381 3716	−504
2	0.324 8121	0.316 7892	951	0.881 6513	0.884 1750	133	0.382 4939	0.383 5889	500
3	0.308 7436	0.300 6760	965	0.886 6357	0.889 0333	120	0.384 6566	0.385 6968	496
4	0.292 5869	0.284 4769	979	0.891 3675	0.893 6382	107	0.386 7096	0.387 6948	492
5	0.276 3466	0.268 1967	992	0.895 8453	0.897 9886	94	0.388 6523	0.389 5822	488
6	+0.260 0278	+0.251 8406	+1006	+0.900 0680	+0.902 0834	− 80	+0.390 4843	+0.391 3586	−484
7	0.243 6357	0.235 4137	1019	0.904 0346	0.905 9216	66	0.392 2049	0.393 0233	479
8	0.227 1753	0.218 9211	1032	0.907 7442	0.909 5022	52	0.393 8137	0.394 5761	474
9	0.210 6517	0.202 3677	1045	0.911 1956	0.912 8243	38	0.395 3105	0.396 0168	469
10	0.194 0698	0.185 7586	1058	0.914 3883	0.915 8874	23	0.396 6950	0.397 3451	464
11	+0.177 4347	+0.169 0986	+1071	+0.917 3217	+0.918 6912	− 8	+0.397 9670	+0.398 5608	−459
12	0.160 7510	0.152 3925	1083	0.919 9958	0.921 2354	+ 7	0.399 1264	0.399 6638	453
13	0.144 0237	0.135 6451	1095	0.922 4101	0.923 5197	23	0.400 1731	0.400 6541	447
14	0.127 2574	0.118 8611	1107	0.924 5643	0.925 5438	39	0.401 1069	0.401 5315	441
15	0.110 4567	0.102 0448	1119	0.926 4581	0.927 3073	55	0.401 9279	0.402 2961	435
16	+0.093 6261	+0.085 2010	+1130	+0.928 0914	+0.928 8103	+ 72	+0.402 6361	+0.402 9478	−429
17	0.076 7701	0.068 3339	1141	0.929 4641	0.930 0527	89	0.403 2313	0.403 4865	422
18	0.059 8929	0.051 4477	1152	0.930 5761	0.931 0343	106	0.403 7135	0.403 9122	415
19	0.042 9989	0.034 5470	1163	0.931 4272	0.931 7547	123	0.404 0826	0.404 2247	408
20	0.026 0927	0.017 6364	1173	0.932 0169	0.932 2136	140	0.404 3385	0.404 4240	400
21	+0.009 1787	+0.000 7201	+1183	+0.932 3449	+0.932 4109	+158	+0.404 4811	+0.404 5099	−392
22	−0.007 7388	−0.016 1975	1193	0.932 4115	0.932 3466	176	0.404 5103	0.404 4823	384
23	0.024 6553	0.033 1117	1202	0.932 2161	0.932 0201	194	0.404 4259	0.404 3412	376
24	0.041 5660	0.050 0177	1211	0.931 7587	0.931 4318	213	0.404 2281	0.404 0866	368
25	0.058 4663	0.066 9112	1219	0.931 0394	0.930 5815	232	0.403 9167	0.403 7184	359
26	−0.075 3517	−0.083 7873	+1227	+0.930 0580	+0.929 4690	+251	+0.403 4916	+0.403 2364	−350
27	0.092 2174	0.100 6413	1235	0.928 8145	0.928 0946	270	0.402 9528	0.402 6408	341
28	0.109 0584	0.117 4682	1242	0.927 3092	0.926 4584	289	0.402 3004	0.401 9316	332
29	0.125 8701	0.134 2634	1249	0.925 5423	0.924 5608	309	0.401 5344	0.401 1088	323
30	0.142 6476	0.151 0220	1255	0.923 5139	0.922 4017	329	0.400 6548	0.400 1724	314
July 1	−0.159 3861	−0.167 7391	+1261	+0.921 2243	+0.919 9817	+349	+0.399 6617	+0.399 1227	−305
2	−0.176 0804	−0.184 4094	+1267	+0.918 6740	+0.917 3013	+370	+0.398 5554	+0.397 9599	−295

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. o.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
July 1	−0.159 3861	−0.167 7391	+1261	+0.921 2243	+0.919 9817	+ 349	+0.399 6617	+0.399 1227	−305
2	0.176 0804	0.184 4094	1267	0.918 6740	0.917 3013	370	0.398 5554	0.397 9599	295
3	0.192 7255	0.201 0280	1272	0.915 8636	0.914 3611	391	0.397 3362	0.396 6844	285
4	0.209 3163	0.217 5898	1277	0.912 7939	0.911 1620	412	0.396 0044	0.395 2963	275
5	0.225 8477	0.234 0895	1281	0.909 4656	0.907 7048	433	0.394 5602	0.393 7961	265
6	−0.242 3145	−0.250 5221	+1285	+0.905 8798	+0.903 9907	+ 454	+0.393 0041	+0.392 1843	−254
7	0.258 7117	0.266 8828	1289	0.902 0378	0.900 0212	475	0.391 3368	0.390 4616	243
8	0.275 0347	0.283 1668	1292	0.897 9412	0.895 7978	496	0.389 5589	0.388 6287	232
9	0.291 2785	0.299 3692	1295	0.893 5913	0.891 3218	517	0.387 6710	0.386 6861	221
10	0.307 4384	0.315 4856	1297	0.888 9896	0.886 5949	539	0.385 6740	0.384 6348	210
11	−0.323 5101	−0.331 5114	+1299	+0.884 1378	+0.881 6186	+ 561	+0.383 5686	+0.382 4754	−199
12	0.339 4891	0.347 4425	1299	0.879 0376	0.876 3950	583	0.381 3554	0.380 2087	188
13	0.355 3712	0.363 2746	1300	0.873 6909	0.870 9256	605	0.379 0354	0.377 8355	176
14	0.371 1521	0.379 0033	1300	0.868 0992	0.865 2120	627	0.376 6092	0.375 3565	164
15	0.386 8277	0.394 6247	1300	0.862 2642	0.859 2560	649	0.374 0776	0.372 7725	152
16	−0.402 3939	−0.410 1348	+1299	+0.856 1875	+0.853 0591	+ 671	+0.371 4413	+0.370 0841	−140
17	0.417 8468	0.425 5295	1297	0.849 8709	0.846 6232	693	0.368 7011	0.367 2923	128
18	0.433 1824	0.440 8049	1295	0.843 3161	0.839 9498	715	0.365 8578	0.364 3976	116
19	0.448 3966	0.455 9569	1292	0.836 5246	0.833 0406	737	0.362 9119	0.361 4007	103
20	0.463 4853	0.470 9813	1289	0.829 4982	0.825 8974	760	0.359 8641	0.358 3022	90
21	−0.478 4444	−0.485 8741	+1285	+0.822 2385	+0.818 5218	+ 782	+0.356 7152	+0.355 1031	− 77
22	0.493 2698	0.500 6311	1281	0.814 7474	0.810 9156	804	0.353 4660	0.351 8040	64
23	0.507 9574	0.515 2482	1276	0.807 0267	0.803 0808	826	0.350 1172	0.348 4056	51
24	0.522 5030	0.529 7213	1270	0.799 0783	0.795 0193	848	0.346 6695	0.344 9089	38
25	0.536 9025	0.544 0462	1264	0.790 9040	0.786 7328	870	0.343 1239	0.341 3146	25
26	−0.551 1517	−0.558 2187	+1258	+0.782 5058	+0.778 2234	+ 892	+0.339 4810	+0.337 6234	− 12
27	0.565 2465	0.572 2346	1251	0.773 8857	0.769 4931	914	0.335 7418	0.333 8364	+ 1
28	0.579 1826	0.586 0898	1244	0.765 0459	0.760 5443	936	0.331 9072	0.329 9544	14
29	0.592 9558	0.599 7800	1236	0.755 9886	0.751 3791	958	0.327 9781	0.325 9784	28
30	0.606 5619	0.613 3009	1228	0.746 7161	0.741 9999	980	0.323 9554	0.321 9092	41
31	−0.619 9964	−0.626 6480	+1219	+0.737 2308	+0.732 4091	+1001	+0.319 8401	+0.317 7482	+ 55
Aug. 1	0.633 2552	0.639 8174	1209	0.727 5353	0.722 6096	1023	0.315 6337	0.313 4966	68
2	0.646 3340	0.652 8045	1199	0.717 6325	0.712 6042	1045	0.311 3371	0.309 1553	82
3	0.659 2284	0.665 6052	1188	0.707 5250	0.702 3956	1066	0.306 9515	0.304 7259	95
4	0.671 9345	0.678 2158	1176	0.697 2162	0.691 9873	1087	0.302 4786	0.300 2098	109
5	−0.684 4485	−0.690 6323	+1164	+0.686 7092	+0.681 3824	+1108	+0.297 9196	+0.295 6083	+122
6	0.696 7666	0.702 8510	1151	0.676 0072	0.670 5841	1128	0.293 2761	0.290 9231	136
7	0.708 8851	0.714 8685	1138	0.665 1136	0.659 5960	1148	0.288 5494	0.286 1553	150
8	0.720 8007	0.726 6814	1124	0.654 0318	0.648 4214	1168	0.283 7410	0.281 3068	164
9	0.732 5102	0.738 2867	1110	0.642 7652	0.637 0637	1188	0.278 8527	0.276 3790	178
10	−0.744 0105	−0.749 6813	+1095	+0.631 3172	+0.625 5262	+1207	+0.273 8858	+0.271 3734	+192
11	0.755 2986	0.760 8621	1079	0.619 6910	0.613 8121	1226	0.268 8419	0.266 2914	206
12	0.766 3715	0.771 8263	1063	0.607 8899	0.601 9248	1245	0.263 7221	0.261 1342	220
13	0.777 2262	0.782 5708	1046	0.595 9172	0.589 8676	1263	0.258 5280	0.255 9036	234
14	0.787 8599	0.793 0930	1029	0.583 7763	0.577 6437	1282	0.253 2611	0.250 6008	248
15	−0.798 2698	−0.803 3900	+1012	+0.571 4703	+0.565 2564	+1301	+0.247 9227	+0.245 2271	+262
16	−0.808 4532	−0.813 4590	+ 994	+0.559 0025	+0.552 7089	+1319	+0.242 5142	+0.239 7841	+276

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. o.	Y		Reduc. to Mean Eq'x of Jan. o.	Z		Reduc. to Mean Eq'x of Jan. o.
	True Equinox.			True Equinox.			True Equinox.		
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Aug. 16	−0.808 4532	−0.813 4590	+994	+0.559 0025	+0.552 7089	+1319	+0.242 5142	+0.239 7841	+276
17	0.818 4070	0.823 2970	976	0.546 3760	0.540 0044	1337	0.237 0370	0.234 2731	290
18	0.828 1285	0.832 9013	957	0.533 5944	0.527 1463	1354	0.231 4925	0.228 6954	304
19	0.837 6150	0.842 2693	938	0.520 6607	0.514 1380	1371	0.225 8820	0.223 0525	318
20	0.846 8637	0.851 3980	918	0.507 5785	0.500 9826	1388	0.220 2071	0.217 3460	331
21	−0.855 8717	−0.860 2846	+898	+0.494 3509	+0.487 6837	+1404	+0.214 4693	+0.211 5771	+345
22	0.864 6363	0.868 9264	877	0.480 9815	0.474 2447	1420	0.208 6697	0.205 7473	359
23	0.873 1547	0.877 3207	856	0.467 4738	0.460 6692	1436	0.202 8101	0.199 8582	373
24	0.881 4241	0.885 4646	834	0.453 8314	0.446 9608	1450	0.196 8919	0.193 9113	387
25	0.889 4419	0.893 3556	812	0.440 0578	0.433 1230	1465	0.190 9166	0.187 9080	401
26	−0.897 2053	−0.900 9907	+789	+0.426 1567	+0.419 1595	+1480	+0.184 8858	+0.181 8501	+414
27	0.904 7115	0.908 3673	766	0.412 1318	0.405 0742	1495	0.178 8012	0.175 7392	427
28	0.911 9577	0.915 4825	742	0.397 9871	0.390 8710	1509	0.172 6644	0.169 5770	440
29	0.918 9413	0.922 3338	718	0.383 7265	0.376 5541	1522	0.166 4772	0.163 3653	453
30	0.925 6597	0.928 9187	693	0.369 3543	0.362 1277	1534	0.160 2415	0.157 1060	466
31	−0.932 1105	−0.935 2347	+668	+0.354 8748	+0.347 5961	+1546	+0.153 9591	+0.150 8010	+479
Sept. 1	0.938 2912	0.941 2796	643	0.340 2923	0.332 9637	1558	0.147 6319	0.144 4522	492
2	0.944 1998	0.947 0514	617	0.325 6111	0.318 2350	1570	0.141 2620	0.138 0617	505
3	0.949 8343	0.952 5482	591	0.310 8360	0.303 4149	1581	0.134 8515	0.131 6316	518
4	0.955 1929	0.957 7682	565	0.295 9722	0.288 5084	1592	0.128 4023	0.125 1638	531
5	−0.960 2741	−0.962 7103	+538	+0.281 0240	+0.273 5196	+1603	+0.121 9164	+0.118 6604	+543
6	0.965 0767	0.967 3730	511	0.265 9957	0.258 4528	1613	0.115 3960	0.112 1234	556
7	0.969 5991	0.971 7550	483	0.250 8915	0.243 3124	1622	0.108 8429	0.105 5547	568
8	0.973 8405	0.975 8555	455	0.235 7160	0.228 1030	1631	0.102 2591	0.098 9562	580
9	0.977 7998	0.979 6733	427	0.220 4738	0.212 8289	1639	0.095 6464	0.092 3298	592
10	−0.981 4759	−0.983 2074	+399	+0.205 1690	+0.197 4945	+1647	+0.089 0068	+0.085 6775	+604
11	0.984 8678	0.986 4569	370	0.189 8060	0.182 1040	1655	0.082 3421	0.079 0008	616
12	0.987 9746	0.989 4208	341	0.174 3890	0.166 6616	1662	0.075 6541	0.072 3019	627
13	0.990 7954	0.992 0983	312	0.158 9223	0.151 1716	1668	0.068 9446	0.065 5824	638
14	0.993 3294	0.994 4886	282	0.143 4100	0.135 6381	1674	0.062 2154	0.058 8440	649
15	−0.995 5757	−0.996 5906	+252	+0.127 8565	+0.120 0656	+1679	+0.055 4683	+0.052 0886	+660
16	0.997 5333	0.998 4037	222	0.112 2659	0.104 4580	1684	0.048 7051	0.045 3180	671
17	0.999 2016	0.999 9270	192	0.096 6424	0.088 8198	1689	0.041 9276	0.038 5341	682
18	1.000 5798	1.001 1599	161	0.080 9905	0.073 1551	1693	0.035 1378	0.031 7388	692
19	1.001 6672	1.002 1016	130	0.065 3142	0.057 4683	1697	0.028 3374	0.024 9338	702
20	−1.002 4631	−1.002 7515	+ 99	+0.049 6180	+0.041 7638	+1700	+0.021 5282	+0.018 1209	+712
21	1.002 9667	1.003 1088	68	0.033 9063	0.026 0460	1703	0.014 7121	0.011 3021	722
22	1.003 1776	1.003 1728	37	0.018 1834	+0.010 3192	1705	0.007 8910	+0.004 4792	732
23	1.003 0946	1.002 9430	+ 5	+0.002 4538	−0.005 4121	1706	+0.001 0668	−0.002 3458	741
24	1.002 7178	1.002 4189	− 27	−0.013 2779	0.021 1432	1707	−0.005 7585	0.009 1709	750
25	−1.002 0463	−1.001 5999	− 59	−0.029 0072	−0.036 8694	+1708	−0.012 5829	−0.015 9942	+759
26	1.001 0797	1.000 4856	91	0.044 7293	0.052 5862	1708	0.019 4044	0.022 8133	768
27	0.999 8175	0.999 0755	124	0.060 4396	0.068 2887	1707	0.026 2207	0.029 6263	776
28	0.998 2597	0.997 3700	156	0.076 1329	0.083 9717	1707	0.033 0298	0.036 4309	784
29	0.996 4065	0.995 3691	189	0.091 8044	0.099 6303	1706	0.039 8294	0.043 2249	792
30	−0.994 2578	−0.993 0728	−222	−0.107 4489	−0.115 2594	+1704	−0.046 6173	−0.050 0062	+799
Oct. 1	−0.991 8140	−0.990 4816	−255	−0.123 0613	−0.130 8540	+1701	−0.053 3914	−0.056 7725	+806

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Oct. 1	−0.991 8140	−0.990 4816	− 255	−0.123 0613	−0.130 8540	+1701	−0.053 3914	−0.056 7725	+806
2	0.989 0757	0.987 5964	288	0.138 6369	0.146 4093	1698	0.060 1493	0.063 5215	813
3	0.986 0438	0.984 4181	321	0.154 1705	0.161 9200	1695	0.066 8889	0.070 2511	820
4	0.982 7193	0.980 9477	354	0.169 6572	0.177 3814	1691	0.073 6080	0.076 9592	827
5	0.979 1033	0.977 1863	387	0.185 0922	0.192 7889	1687	0.080 3045	0.083 6436	834
6	−0.975 1970	−0.973 1354	− 420	−0.200 4710	−0.208 1378	+1682	−0.086 9764	−0.090 3025	+841
7	0.971 0017	0.968 7962	454	0.215 7889	0.223 4236	1676	0.093 6218	0.096 9339	847
8	0.966 5189	0.964 1701	488	0.231 0414	0.238 6418	1670	0.100 2386	0.103 5357	853
9	0.961 7499	0 959 2585	522	0.246 2242	0.253 7880	1663	0.106 8250	0.110 1062	858
10	0.956 6960	0.954 0627	556	0.261 3328	0.268 8579	1656	0.113 3791	0.116 6435	863
11	−0.951 3587	−0.948 5842	− 589	−0.276 3629	−0.283 8472	+1649	−0.119 8992	−0.123 1458	+868
12	0.945 7394	0.942 8245	623	0.291 3102	0.298 7515	1641	0.126 3832	0.129 6111	873
13	0.939 8397	0.936 7852	656	0.306 1704	0.313 5665	1632	0.132 8293	0.136 0377	877
14	0.933 6611	0.930 4677	690	0.320 9393	0.328 2882	1623	0.139 2360	0.142 4240	881
15	0.927 2052	0.923 8737	723	0.335 6126	0.342 9122	1614	0.145 6014	0.148 7680	885
16	−0.920 4735	−0.917 0048	− 757	−0.350 1863	−0.357 4344	+1604	−0.151 9235	−0.155 0677	+888
17	0.913 4678	0.909 8627	790	0.364 6560	0.371 8506	1593	0.158 2005	0.161 3216	891
18	0.906 1897	0.902 4490	824	0.379 0176	0.386 1565	1582	0.164 4307	0.167 5277	894
19	0.898 6409	0.894 7655	857	0.393 2667	0.400 3478	1571	0.170 6124	0.173 6845	897
20	0.890 8231	0.886 8138	891	0.407 3993	0.414 4206	1559	0.176 7437	0.179 7899	899
21	−0.882 7380	−0.878 5958	− 924	−0.421 4112	−0.428 3705	+1547	−0.182 8227	−0.185 8420	+901
22	0.874 3876	0.870 1135	958	0.435 2980	0.442 1931	1534	0.188 8475	0.191 8391	902
23	0.865 7738	0.861 3687	991	0.449 0552	0.455 8839	1521	0.194 8164	0.197 7792	903
24	0.856 8984	0.852 3633	1025	0.462 6786	0.469 4387	1507	0.200 7273	0.203 6604	903
25	0.847 7636	0.843 0997	1058	0.476 1637	0.482 8530	1492	0.206 5782	0.209 4806	903
26	−0.838 3719	−0.833 5805	−1091	−0.489 5060	−0.496 1222	+1477	−0.212 3672	−0.215 2379	+904
27	0.828 7257	0.823 8079	1124	0.502 7011	0.509 2420	1461	0.218 0924	0.220 9305	904
28	0.818 8274	0.813 7847	1157	0.515 7443	0.522 2076	1445	0.223 7518	0.226 5561	903
29	0.808 6801	0.803 5140	1190	0.528 6312	0.535 0147	1428	0.229 3432	0.232 1128	902
30	0.798 2869	0.792 9991	1223	0.541 3575	0.547 6591	1411	0.234 8647	0.237 5987	901
31	−0.787 6510	−0.782 2431	−1255	−0.553 9189	−0.560 1364	+1394	−0.240 3145	−0.243 0120	+899
Nov. 1	0.776 7759	0.771 2496	1288	0.566 3111	0.572 4426	1376	0.245 6909	0.248 3510	897
2	0.765 6649	0.760 0221	1320	0.578 5304	0.584 5740	1358	0.250 9920	0.253 6138	895
3	0.754 3218	0.748 5643	1352	0.590 5728	0.596 5265	1339	0.256 2162	0.258 7990	892
4	0.742 7501	0.736 8797	1384	0.602 4345	0.608 2965	1320	0.261 3620	0.263 9049	889
5	−0.730 9536	−0.724 9723	−1416	−0.614 1120	−0.619 8806	+1300	−0.266 4276	−0.268 9300	+886
6	0.718 9361	0.712 8456	1447	0.625 6018	0.631 2753	1280	0.271 4118	0.273 8728	882
7	0.706 7011	0.700 5032	1478	0.636 9006	0.642 4773	1259	0.276 3129	0.278 7319	878
8	0.694 2523	0.687 9488	1509	0.648 0049	0.653 4831	1238	0.281 1296	0.283 5059	874
9	0.681 5933	0.675 1862	1540	0.658 9115	0.664 2896	1215	0.285 8605	0.288 1934	869
10	−0.668 7280	−0.662 2192	−1571	−0.669 6171	−0.674 8936	+1192	−0.290 5043	−0.292 7932	+864
11	0.655 6603	0.649 0517	1601	0.680 1187	0.685 2920	1168	0.295 0597	0.297 3037	859
12	0.642 3939	0.635 6873	1631	0.690 4132	0.695 4819	1144	0.299 5251	0.301 7237	853
13	0.628 9325	0.622 1298	1661	0.700 4976	0.705 4600	1120	0.303 8994	0.306 0521	847
14	0.615 2798	0.608 3830	1690	0.710 3688	0.715 2235	1096	0.308 1815	0.310 2875	841
15	−0.601 4398	−0.594 4508	−1719	−0.720 0238	−0.724 7694	+1072	−0.312 3699	−0.314 4286	+835
16	−0.587 4163	−0.580 3369	−1748	−0.729 4598	−0.734 0947	+1048	−0.316 4634	−0.318 4742	+828

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. 0.	Y		Reduc. to Mean Eq'x of Jan. 0.	Z		Reduc. to Mean Eq'x of Jan. 0.
	True Equinox.			True Equinox.			True Equinox.		
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Nov. 16	−0.587 4163	−0.580 3369	−1748	−0.729 4598	−0.734 0947	+1048	−0.316 4634	−0.318 4742	+828
17	0.573 2130	0.566 0451	1777	0.738 6737	0.743 1965	1023	0.320 4608	0.322 4230	820
18	0.558 8337	0.551 5793	1805	0.747 6627	0.752 0719	997	0.324 3607	0.326 2737	812
19	0.544 2825	0.536 9436	1833	0.756 4237	0.760 7179	970	0.328 1619	0.330 0250	804
20	0.529 5633	0.522 1420	1861	0.764 9540	0.769 1316	943	0.331 8630	0.333 6756	796
21	−0.514 6803	−0.507 1786	−1888	−0.773 2504	−0.777 3100	+ 915	−0.335 4628	−0.337 2243	+787
22	0.499 6376	0.492 0577	1915	0.781 3100	0.785 2501	887	0.338 9600	0.340 6696	778
23	0.484 4396	0.476 7838	1942	0.789 1298	0.792 9488	858	0.342 3531	0.344 0102	769
24	0.469 0909	0.461 3614	1968	0.796 7068	0.800 4034	829	0.345 6409	0.347 2449	759
25	0.453 5960	0.445 7953	1993	0.804 0383	0.807 6112	799	0.348 8221	0.350 3724	749
26	−0.437 9599	−0.430 0905	−2018	−0.811 1217	−0.814 5695	+ 769	−0.351 8956	−0.353 3915	+739
27	0.422 1876	0.414 2519	2043	0.817 9542	0.821 2755	739	0.354 8600	0.356 3010	728
28	0.406 2841	0.398 2848	2068	0.824 5331	0.827 7268	708	0.357 7143	0.359 0998	717
29	0.390 2548	0.382 1945	2092	0.830 8563	0.833 9213	676	0.360 4575	0.361 7871	706
30	0.374 1048	0.365 9863	2116	0.836 9216	0.839 8569	644	0.363 0886	0.364 3619	694
Dec. 1	−0.357 8396	−0.349 6655	−2139	−0.842 7271	−0.845 5319	+ 612	−0.365 6069	−0.366 8235	+682
2	0.341 4646	0.333 2376	2162	0.848 2710	0.850 9442	579	0.368 0116	0.369 1711	670
3	0.324 9850	0.316 7075	2184	0.853 5515	0.856 0927	546	0.370 3019	0.371 4040	657
4	0.308 4058	0.300 0807	2205	0.858 5675	0.860 9758	512	0.372 4773	0.373 5218	644
5	0.291 7327	0.283 3625	2226	0.863 3173	0.865 5918	478	0.374 5373	0.375 5237	631
6	−0.274 9707	−0.266 5580	−2246	−0.867 7992	−0.869 9394	+ 444	−0.376 4810	−0.377 4092	+618
7	0.258 1250	0.249 6724	2265	0.872 0123	0.874 0178	409	0.378 3081	0.379 1778	604
8	0.241 2008	0.232 7109	2285	0.875 9556	0.877 8257	373	0.380 0182	0.380 8292	590
9	0.224 2033	0.215 6789	2303	0.879 6279	0.881 3621	337	0.381 6107	0.382 3628	576
10	0.207 1378	0.198 5811	2321	0.883 0282	0.884 6261	301	0.383 0853	0.383 7783	561
11	−0.190 0092	−0.181 4228	−2339	−0.886 1556	−0.887 6167	+ 264	−0.384 4417	−0.385 0754	+546
12	0.172 8225	0.164 2089	2356	0.889 0092	0.890 3331	227	0.385 6794	0.386 2537	531
13	0.155 5827	0.146 9445	2371	0.891 5882	0.892 7745	190	0.386 7982	0.387 3129	516
14	0.138 2950	0.129 6347	2386	0.893 8919	0.894 9403	152	0.387 7977	0.388 2526	500
15	0.120 9643	0.112 2844	2401	0.895 9196	0.896 8298	114	0.388 6776	0.389 0726	484
16	−0.103 5956	−0.094 8985	−2416	−0.897 6707	−0.898 4422	+ 76	−0.389 4375	−0.389 7723	+468
17	0.086 1938	0.077 4821	2430	0.899 1441	0.899 7764	+ 37	0.390 0771	0.390 3517	452
18	0.068 7640	0.060 0402	2443	0.900 3391	0.900 8321	− 3	0.390 5962	0.390 8104	435
19	0.051 3114	0.042 5781	2454	0.901 2553	0.901 6085	42	0.390 9944	0.391 1480	418
20	0.033 8411	0.025 1011	2465	0.901 8917	0.902 1048	82	0.391 2712	0.391 3640	401
21	−0.016 3587	−0.007 6145	−2475	−0.902 2478	−0.902 3207	− 122	−0.391 4264	−0.391 4583	+385
22	+0.001 1307	+0.009 8761	2484	0.902 3233	0.902 2556	162	0.391 4597	0.391 4306	367
23	0.018 6211	0.027 3651	2493	0.902 1175	0.901 9090	203	0.391 3709	0.391 2806	349
24	0.036 1073	0.044 8469	2502	0.901 6301	0.901 2808	244	0.391 1597	0.391 0083	331
25	0.053 5832	0.062 3156	2510	0.900 8610	0.900 3708	285	0.390 8263	0.390 6137	312
26	+0.071 0432	+0.079 7654	−2518	−0.899 8103	−0.899 1794	− 326	−0.390 3705	−0.390 0968	+293
27	0.088 4814	0.097 1905	2524	0.898 4782	0.897 7067	368	0.389 7925	0.389 4577	275
28	0.105 8920	0.114 5851	2529	0.896 8649	0.895 9530	410	0.389 0924	0.388 6966	256
29	0.123 2691	0.131 9433	2533	0.894 9710	0.893 9191	452	0.388 2704	0.387 8138	237
30	0.140 6071	0.149 2597	2536	0.892 7974	0.891 6060	494	0.387 3269	0.386 8097	218
31	+0.157 9004	+0.166 5285	−2538	−0.890 3449	−0.889 0144	− 536	−0.386 2623	−0.385 6848	+199
32	+0.175 1433	+0.183 7440	−2540	−0.887 6145	−0.886 1454	− 579	−0.385 0772	−0.384 4396	+179

MOON'S LONGITUDE AND LATITUDE, 1913.

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JANUARY.		Day of Month.	FEBRUARY.		Day of Month.	MARCH.	
	True Long.	Latitude.		True Long.	Latitude.		True Long.	Latitude.
	° ′ ″	° ′ ″		° ′ ″	° ′ ″		° ′ ″	° ′ ″
1.0	211 12 13.3	−2 0 22.8	1.0	259 42 27.5	−4 55 47.2	1.0	269 2 5.7	−5 13 45.7
1.5	217 48 51.9	2 31 27.9	1.5	265 54 9.9	5 2 33.5	1.5	275 11 16.1	5 14 29.9
2.0	224 22 1.1	3 0 14.3	2.0	272 3 11.1	5 5 45.9	2.0	281 17 7.7	5 11 39.9
2.5	230 51 55.1	3 26 23.7	2.5	278 9 47.9	5 5 26.3	2.5	287 20 8.7	5 5 22.2
3.0	237 18 46.8	3 49 40.2	3.0	284 14 15.3	5 1 38.9	3.0	293 20 46.0	4 55 44.8
3.5	243 42 46.9	−4 9 50.3	3.5	290 16 47.0	−4 54 29.1	3.5	299 19 24.9	−4 42 56.6
4.0	250 4 4.1	4 26 43.6	4.0	296 17 35.1	4 44 4.3	4.0	305 16 29.0	4 27 7.7
4.5	256 22 45.2	4 40 12.1	4.5	302 16 51.0	4 30 33.2	4.5	311 12 20.3	4 8 28.8
5.0	262 38 55.3	4 50 10.3	5.0	308 14 45.6	4 14 6.0	5.0	317 7 19.3	3 47 11.8
5.5	268 52 38.2	4 56 35.3	5.5	314 11 29.5	3 54 54.3	5.5	323 1 44.8	3 23 30.0
6.0	275 3 57.0	−4 59 26.8	6.0	320 7 13.5	−3 33 11.2	6.0	328 55 54.5	−2 57 37.6
6.5	281 12 54.5	4 58 46.8	6.5	326 2 9.6	3 9 10.8	6.5	334 50 5.0	2 29 49.7
7.0	287 19 33.6	4 54 39.5	7.0	331 56 30.7	2 43 8.1	7.0	340 44 32.0	2 0 22.7
7.5	293 23 58.4	4 47 11.4	7.5	337 50 31.4	2 15 19.1	7.5	346 39 30.6	1 29 33.9
8.0	299 26 14.7	4 36 30.7	8.0	343 44 28.2	1 46 0.6	8.0	352 35 15.8	0 57 41.7
8.5	305 26 30.0	−4 22 47.4	8.5	349 38 39.3	−1 15 29.9	8.5	358 32 2.6	−0 25 5.0
9.0	311 24 54.4	4 6 12.8	9.0	355 33 25.4	0 44 4.4	9.0	4 30 6.5	+0 7 56.4
9.5	317 21 40.6	3 46 59.3	9.5	1 29 9.7	−0 12 2.9	9.5	10 29 43.5	0 41 2.2
10.0	323 17 4.7	3 25 20.4	10.0	7 26 18.0	+0 20 16.2	10.0	16 31 10.3	1 13 51.5
10.5	329 11 25.9	3 1 30.1	10.5	13 25 18.4	0 52 34.1	10.5	22 34 44.8	1 46 3.0
11.0	335 5 6.5	−2 35 43.2	11.0	19 26 40.8	+1 24 31.2	11.0	28 40 45.9	+2 17 15.4
11.5	340 58 32.4	2 8 14.7	11.5	25 30 57.5	1 55 47.7	11.5	34 49 33.7	2 47 7.3
12.0	346 52 12.8	1 39 20.2	12.0	31 38 42.4	2 26 3.3	12.0	41 1 29.4	3 15 16.9
12.5	352 46 39.5	1 9 15.5	12.5	37 50 30.2	2 54 56.8	12.5	47 16 55.1	3 41 22.8
13.0	358 42 27.4	0 38 17.0	13.0	44 6 55.8	3 22 6.3	13.0	53 36 13.7	4 5 3.6
13.5	4 40 14.0	−0 6 41.3	13.5	50 28 33.8	+3 47 9.4	13.5	59 59 47.9	+4 25 58.1
14.0	10 40 38.2	+0 25 14.0	14.0	56 55 56.8	4 9 42.8	14.0	66 28 0.4	4 43 45.7
14.5	16 44 20.6	0 57 10.6	14.5	63 29 35.0	4 29 22.7	14.5	73 1 12.5	4 58 6.5
15.0	22 52 2.5	1 28 49.0	15.0	70 9 54.0	4 45 45.1	15.0	79 39 43.5	5 8 41.2
15.5	29 4 24.9	1 59 48.7	15.5	76 57 13.6	4 58 26.1	15.5	86 23 49.9	5 15 11.9
16.0	35 22 7.9	+2 29 47.6	16.0	83 51 46.5	+5 7 2.7	16.0	93 13 44.0	+5 17 23.0
16.5	41 45 49.0	2 58 21.9	16 5	90 53 35.6	5 11 13.8	16.5	100 9 33.3	5 15 1.1
17.0	48 16 1.9	3 25 6.4	17.0	98 2 33.7	5 10 41.3	17.0	107 11 18.5	5 7 56.5
17.5	54 53 15.3	3 49 34.5	17.5	105 18 21.5	5 5 11.5	17.5	114 18 52.8	4 56 3.5
18.0	61 37 50.8	4 11 18.3	18.0	112 40 26.9	4 54 36.3	18.0	121 32 0.9	4 39 22.0
18.5	68 30 0.9	+4 29 49.5	18.5	120 8 5.4	+4 38 54.8	18.5	128 50 18.5	+4 17 58.1
19.0	75 29 47.8	4 44 39.9	19.0	127 40 20.3	4 18 14.2	19.0	136 13 12.1	3 52 4.7
19.5	82 37 1.7	4 55 22.6	19.5	135 16 4.6	3 52 50.7	19.5	143 39 58.6	3 22 2.6
20.0	89 51 19.1	5 1 33.6	20.0	142 54 3.5	3 23 9.5	20.0	151 9 45.9	2 48 20.1
20.5	97 12 3.4	5 2 53.5	20.5	150 32 57.4	2 49 44.4	20.5	158 41 35.5	2 11 32.5
21.0	104 38 24.2	+4 59 8.6	21.0	158 11 25.0	+2 13 16.1	21.0	166 14 23.1	+1 32 21.7
21.5	112 9 19.2	4 50 12.3	21.5	165 48 7.0	1 34 30.9	21.5	173 47 1.3	0 51 34.1
22.0	119 43 36.2	4 36 6.8	22.0	173 21 49.6	0 54 18.4	22.0	181 18 22.2	+0 9 58.9
22.5	127 19 56.0	4 17 3.4	22.5	180 51 27.2	+0 13 28.8	22.5	188 47 19.3	−0 31 33.6
23.0	134 56 56.2	3 53 22.6	23.0	188 16 4.0	−0 27 9.5	23.0	196 12 50.7	1 12 14.8
23.5	142 33 14.8	+3 25 32.8	23.5	195 34 55.5	−1 6 51.1	23.5	203 34 1.0	−1 51 19.7
24.0	150 7 34.6	2 54 9.7	24.0	202 47 29.2	1 44 55.3	24.0	210 50 2.6	2 28 8.0
24.5	157 38 45.6	2 19 54.5	24.5	209 53 24.0	2 20 47.3	24.5	218 0 17.3	3 2 5.5
25.0	165 5 48.0	1 43 30.9	25.0	216 52 29.9	2 53 58.4	25.0	225 4 16.7	3 32 44.6
25.5	172 27 53.2	1 5 44.0	25.5	223 44 46.4	3 24 5.6	25.5	232 1 42.3	3 59 44.7
26.0	179 44 25.2	+0 27 18.1	26 0	230 30 21.1	−3 50 51.3	26.0	238 52 25.4	−4 22 51.2
26.5	186 55 0.1	−0 11 4.9	26.5	237 9 29.0	4 14 3.2	26.5	245 36 26.1	4 41 55.4
27.0	193 59 25.1	0 48 46.5	27.0	243 42 30.1	4 33 33.3	27.0	252 13 52.7	4 56 53.5
27.5	200 57 37.5	1 25 12.4	27.5	250 9 48.7	4 49 17.1	27.5	258 45 0.4	5 7 45.8
28.0	207 49 42.9	1 59 52.6	28.0	256 31 51.6	5 1 12.9	28.0	265 10 9.8	5 14 35.7
28.5	214 35 53.4	−2 32 21.4	28.5	262 49 7.4	−5 9 21.5	28.5	271 29 46.6	−5 17 29.2
29.0	221 16 25.9	3 2 17.4	29.0	269 2 5.7	5 13 45.7	29.0	277 44 19.9	5 16 34.4
29.5	227 51 41.8	3 29 23.2	29.5	275 11 16.1	5 14 29.9	29.5	283 54 21.0	5 12 0.3
30.0	234 22 3.9	3 53 24.6	30.0	281 17 7.7	5 11 39.9	30.0	290 0 23.5	5 3 56.9
30.5	240 47 55.8	4 14 10.7	30.5	287 20 8.7	5 5 22.2	30.5	296 3 1.5	4 52 35.1
31.0	247 9 41.7	−4 31 33.3	31.0	293 20 46.0	−4 55 44.8	31.0	302 2 49.1	−4 38 6.4
31.5	253 27 45.0	−4 45 26.7	31.5	299 19 24.9	−4 42 56.6	31.5	308 0 20.4	−4 20 42.5

MOON'S LONGITUDE AND LATITUDE, 1913.

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	APRIL.		Day of Month.	MAY.		Day of Month.	JUNE.	
	True Long.	Latitude.		True Long.	Latitude.		True Long.	Latitude.
	° ′ ″	° ′ ″		° ′ ″	° ′ ″		° ′ ″	° ′ ″
1.0	313 56 8.7	−4 0 35.8	1.0	345 47 33.9	−1 30 45.7	1.0	30 7 25.7	+2 29 14.9
1.5	319 50 46.1	3 37 59.0	1.5	351 43 23.0	0 59 21.2	1.5	36 24 30.9	2 57 17.5
2.0	325 44 43.2	3 13 5.6	2.0	357 40 51.9	−0 27 10.6	2.0	42 46 25.9	3 23 27.0
2.5	331 38 28.6	2 46 9.9	2.5	3 40 29.3	+0 5 27.7	2.5	49 13 21.4	3 47 19.4
3.0	337 32 29.2	2 17 26.8	3.0	9 42 41.4	0 38 14.3	3.0	55 45 21.7	4 8 30.6
3.5	343 27 10.1	−1 47 12.3	3.5	15 47 51.0	+1 10 48.5	3.5	62 22 24.7	+4 26 36.7
4.0	349 22 54.2	1 15 43.5	4.0	21 56 17.3	1 42 48.5	4.0	69 4 21.2	4 41 15.3
4.5	355 20 2.2	0 43 18.3	4.5	28 8 15.5	2 13 51.6	4.5	75 50 55.9	4 52 6.5
5.0	1 18 52.7	−0 10 16.0	5.0	34 23 57.3	2 43 34.3	5.0	82 41 47.5	4 58 53.2
5.5	7 19 42.6	+0 23 3.1	5.5	40 43 30.3	3 11 32.2	5.5	89 36 29.3	5 1 21.7
6.0	13 22 46.7	+0 56 18.2	6.0	47 6 57.9	+3 37 21.4	6.0	96 34 31.3	+4 59 23.2
6.5	19 28 18.2	1 29 7.3	6.5	53 34 20.1	4 0 38.2	6.5	103 35 20.6	4 52 53.8
7.0	25 36 28.5	2 1 7.5	7.0	60 5 33.4	4 20 59.6	7.0	110 38 22.7	4 41 55.0
7.5	31 47 27.9	2 31 55.9	7.5	66 40 30.6	4 38 4.2	7.5	117 43 4.0	4 26 33.9
8.0	38 1 25.5	3 1 9.6	8.0	73 19 2.4	4 51 32.7	8.0	124 48 52.2	4 7 3.0
8.5	44 18 29.7	+3 28 25.3	8.5	80 0 57.2	+5 1 8.5	8.5	131 55 17.5	+3 43 39.9
9.0	50 38 47.8	3 53 20.5	9.0	86 46 2.1	5 6 37.8	9.0	139 1 54.1	3 16 46.7
9.5	57 2 26.7	4 15 33.7	9.5	93 34 3.2	5 7 50.7	9.5	146 8 19.9	2 46 49.8
10.0	63 29 33.0	4 34 44.2	10.0	100 24 46.8	5 4 40.8	10.0	153 14 16.9	2 14 18.5
10.5	70 0 13.2	4 50 32.6	10.5	107 17 59.7	4 57 6.3	10.5	160 19 30.8	1 39 44.8
11.0	76 34 33.4	+5 2 41.5	11.0	114 13 28.9	+4 45 9.4	11.0	167 23 51.3	+1 3 42.4
11.5	83 12 39.2	5 10 55.4	11.5	121 11 2.6	4 28 56.7	11.5	174 27 10.3	+0 26 46.2
12.0	89 54 35.8	5 15 1.2	12.0	128 10 30.3	4 8 39.1	12.0	181 29 21.6	−0 10 28.4
12.5	96 40 27.6	5 14 48.4	12.5	135 11 42.4	3 44 32.2	12.5	188 30 19.9	0 47 26.4
13.0	103 30 17.6	5 10 9.7	13.0	142 14 29.5	3 16 55.5	13.0	195 29 59.8	1 23 33.3
13.5	110 24 7.0	+5 1 1.2	13.5	149 18 42.7	+2 46 12.5	13.5	202 28 15.1	−1 58 16.2
14.0	117 21 54.9	4 47 23.3	14.0	156 24 12.3	2 12 50.5	14.0	209 24 58.2	2 31 4.0
14.5	124 23 37.3	4 29 20.4	14.5	163 30 47.7	1 37 20.2	14.5	216 19 59.5	3 1 28.0
15.0	131 29 6.5	4 7 1.8	15.0	170 38 16.1	1 0 15.3	15.0	223 13 7.2	3 29 2.5
15.5	138 38 10.4	3 40 42.1	15.5	177 46 22.6	+0 22 11.8	15.5	230 4 7.3	3 53 25.2
16.0	145 50 31.9	+3 10 41.4	16.0	184 54 49.1	−0 16 12.9	16.0	236 52 44.2	−4 14 17.6
16.5	153 5 48.8	2 37 25.2	16.5	192 3 13.8	0 54 20.1	16.5	243 38 41.3	4 31 25.2
17.0	160 23 33.1	2 1 24.6	17.0	199 11 11.9	1 31 31.3	17.0	250 21 41.1	4 44 37.7
17.5	167 43 10.8	1 23 15.7	17.5	206 18 15.3	2 7 9.4	17.5	257 1 26.2	4 53 49.3
18.0	175 4 2.8	0 43 38.4	18.0	213 23 53.1	2 40 39.3	18.0	263 37 40.8	4 58 58.5
18.5	182 25 25.4	+0 3 16.0	18.5	220 27 32.7	−3 11 29.1	18.5	270 10 11.6	−5 0 7.5
19.0	189 46 30.9	−0 37 6.6	19.0	227 28 40.5	3 39 10.7	19.0	276 38 47.6	4 57 22.2
19.5	197 6 29.4	1 16 44.3	19.5	234 26 43.4	4 3 21.0	19.5	283 3 21.8	4 50 51.7
20.0	204 24 30.3	1 54 53.8	20.0	241 21 10.3	4 23 42.3	20.0	289 23 51.5	4 40 47.8
20.5	211 39 43.7	2 30 54.8	20.5	248 11 32.7	4 40 2.2	20.5	295 40 18.8	4 27 24.4
21.0	218 51 23.0	−3 4 11.5	21.0	254 57 26.3	−4 52 13.5	21.0	301 52 50.3	−4 10 57.0
21.5	225 58 45.5	3 34 13.6	21.5	261 38 32.2	5 0 14.1	21.5	308 1 37.7	3 51 42.1
22.0	233 1 14.5	4 0 37.1	22.0	268 14 37.8	5 4 6.4	22.0	314 6 57.5	3 29 56.9
22.5	239 58 20.1	4 23 4.5	22.5	274 45 36.3	5 3 56.7	22.5	320 9 10.5	3 5 58.9
23.0	246 49 40.2	4 41 24.0	23.0	281 11 27.4	4 59 54.4	23.0	326 8 42.0	2 40 5.8
23.5	253 35 1.0	−4 55 30.1	23.5	287 32 17.5	−4 52 11.7	23.5	332 6 0.7	−2 12 35.1
24.0	260 14 16.9	5 5 21.9	24.0	293 48 19.6	4 41 2.3	24.0	338 1 38.9	1 43 43.9
24.5	266 47 29.7	5 11 3.2	24.5	299 59 52.1	4 26 41.2	24.5	343 56 11.6	1 13 49.3
25.0	273 14 49.3	5 12 41.0	25.0	306 7 18.4	4 9 24.0	25.0	349 50 16.3	0 43 8.2
25.5	279 36 31.7	5 10 24.9	25.5	312 11 6.3	3 49 27.0	25.5	355 44 32.2	−0 11 57.4
26.0	285 52 58.7	−5 4 26.1	26.0	318 11 47.2	−3 27 6.3	26.0	1 39 39.6	+0 19 26.3
26.5	292 4 37.0	4 54 57.4	26.5	324 9 56.2	3 2 37.9	26.5	7 36 19.9	0 50 45.6
27.0	298 11 57.0	4 42 12.4	27.0	330 6 10.8	2 36 17.8	27.0	13 35 14.2	1 21 42.7
27.5	304 15 32.3	4 26 24.8	27.5	336 1 9.9	2 8 21.7	27.5	19 37 3.0	1 51 59.5
28.0	310 15 58.6	4 7 48.8	28.0	341 55 33.1	1 39 5.6	28.0	25 42 25.5	2 21 16.8
28.5	316 13 53.2	−3 46 38.7	28.5	347 50 1.1	−1 8 45.6	28.5	31 51 58.9	+2 49 14.4
29.0	322 9 54.1	3 23 8.9	29.0	353 45 14.5	0 37 37.7	29.0	38 6 16.8	3 15 31.3
29.5	328 4 39.3	2 57 33.7	29.5	359 41 53.0	−0 5 58.8	29.5	44 25 48.7	3 39 45.3
30.0	333 58 46.7	2 30 7.9	30.0	5 40 35.0	+0 25 53.7	30.0	50 50 59.2	4 1 33.7
30.5	339 52 53.1	2 1 6.7	30.5	11 41 57.1	0 57 41.3	30.5	57 22 6.4	4 20 33.3
31.0	345 47 33.9	−1 30 45.7	31.0	17 46 33.2	+1 29 4.6	31.0	63 59 21.2	+4 36 20.8
31.5	351 43 23.0	−0 59 21.2	31.5	23 54 53.8	+1 59 43.0	31.5	70 42 45.9	+4 48 33.9

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JULY.		Day of Month.	AUGUST.		Day of Month.	SEPTEMBER.	
	True Long.	Latitude.		True Long.	Latitude.		True Long.	Latitude.
	° ′ ″	° ′ ″		° ′ ″	° ′ ″		° ′ ″	° ′ ″
1.0	63 59 21.2	+4 36 20.8	1.0	114 14 16.6	+4 29 15.1	1.0	167 31 20.5	+0 36 27.0
1.5	70 42 45.9	4 48 33.9	1.5	121 35 16.6	4 7 50.0	1.5	175 6 1.4	−0 5 27.3
2.0	77 32 14.5	4 56 52.0	2.0	128 59 52.7	3 42 3.7	2.0	182 38 49.4	0 47 6.6
2.5	84 27 31.6	5 0 57.1	2.5	136 27 3.6	3 12 20.1	2.5	190 8 40.9	1 27 41.6
3.0	91 28 12.8	5 0 34.7	3.0	143 55 44.8	2 39 10.2	3.0	197 34 39.4	2 6 26.3
3.5	98 33 44.8	+4 55 35.4	3.5	151 24 50.0	+2 3 11.4	3.5	204 55 57.4	−2 42 40.3
4.0	105 43 26.7	4 45 55.2	4.0	158 53 15.9	1 25 6.0	4.0	212 11 57.2	3 15 49.7
4.5	112 56 32.5	4 31 36.7	4.5	166 20 3.6	0 45 39.0	4.5	219 22 10.7	3 45 26.9
5.0	120 12 11.6	4 12 49.2	5.0	173 44 20.3	+0 5 36.5	5.0	226 26 19.6	4 11 11.4
5.5	127 29 31.7	3 49 48.9	5.5	181 5 21.2	−0 34 16.2	5.5	233 24 15.0	4 32 48.9
6.0	134 47 40.6	+3 22 58.5	6.0	188 22 30.1	−1 13 16.0	6.0	240 15 56.0	−4 50 11.1
6.5	142 5 49.0	2 52 46.2	6.5	195 35 19.2	1 50 43.2	6.5	247 1 28.4	5 3 14.7
7.0	149 23 11.6	2 19 44.9	7.0	202 43 28.9	2 26 2.7	7.0	253 41 4.1	5 12 0.4
7.5	156 39 8.6	1 44 31.2	7.5	209 46 47.2	2 58 44.3	7.5	260 14 59.3	5 16 32.7
8.0	163 53 6.8	1 7 43.4	8.0	216 45 9.4	3 28 22.9	8.0	266 43 33.8	5 16 58.5
8.5	171 4 39.9	+0 30 0.7	8.5	223 38 35.8	−3 54 38.1	8.5	273 7 10.1	−5 13 27.1
9.0	178 13 28.0	−0 7 57.8	9.0	230 27 11.6	4 17 14.3	9.0	279 26 12.1	5 6 9.3
9.5	185 19 17.6	0 45 34.1	9.5	237 11 5.1	4 36 0.6	9.5	285 41 4.5	4 55 17.6
10.0	192 22 0.2	1 22 12.6	10.0	243 50 27.0	4 50 49.6	10.0	291 52 12.2	4 41 5.4
10.5	199 21 31.6	1 57 20.5	10.5	250 25 29.5	5 1 37.4	10.5	298 0 0.0	4 23 47.0
11.0	206 17 51.0	−2 30 27.5	11.0	256 56 25.8	−5 8 23.6	11.0	304 4 51.7	−4 3 37.5
11.5	213 10 59.8	3 1 6.7	11.5	263 23 29.5	5 11 10.4	11.5	310 7 10.7	3 40 52.5
12.0	220 1 0.1	3 28 54.7	12.0	269 46 53.7	5 10 2.4	12.0	316 7 19.0	3 15 48.8
12.5	226 47 54.8	3 53 32.0	12.5	276 6 51.2	5 5 6.7	12.5	322 5 37.7	2 48 43.5
13.0	233 31 46.6	4 14 42.3	13.0	282 23 34.4	4 56 32.3	13.0	328 2 26.6	2 19 54.5
13.5	240 12 37.2	−4 32 12.7	13.5	288 37 15.1	−4 44 30.1	13.5	333 58 4.4	−1 49 39.9
14.0	246 50 27.1	4 45 53.9	14.0	294 48 4.3	4 29 12.8	14.0	339 52 49.3	1 18 18.3
14.5	253 25 16.1	4 55 40.3	14.5	300 56 13.1	4 10 54.3	14.5	345 46 58.7	0 46 9.0
15.0	259 57 3.2	5 1 29.5	15.0	307 1 52.3	3 49 50.1	15.0	351 40 49.6	−0 13 31.5
15.5	266 25 46.2	5 3 22.3	15.5	313 5 13.0	3 26 16.8	15.5	357 34 38.8	+0 19 14.7
16.0	272 51 22.9	−5 1 22.5	16.0	319 6 26.6	−3 0 31.8	16.0	3 28 43.0	+0 51 50.1
16.5	279 13 51.1	4 55 37.2	16.5	325 5 45.2	2 32 53.3	16.5	9 23 19.3	1 23 54.9
17.0	285 33 9.3	4 46 15.8	17.0	331 3 22.1	2 3 39.9	17.0	15 18 45.1	1 55 9.6
17.5	291 49 17.7	4 33 30.1	17.5	336 59 32.2	1 33 10.9	17.5	21 15 18.8	2 25 15.0
18.0	298 2 18.2	4 17 33.8	18.0	342 54 31.5	1 1 45.5	18.0	27 13 19.5	2 53 52.3
18.5	304 12 14.2	−3 58 42.3	18.5	348 48 37.7	−0 29 43.0	18.5	33 13 7.3	+3 20 43.0
19.0	310 19 12.6	3 37 12.5	19.0	354 42 11.0	+0 2 37.6	19.0	39 15 3.4	3 45 29.2
19.5	316 23 22.9	3 13 21.9	19.5	0 35 33.1	0 34 57.1	19.5	45 19 30.2	4 7 53.3
20.0	322 24 57.7	2 47 28.8	20.0	6 29 7.9	1 6 56.8	20.0	51 26 51.5	4 27 38.4
20.5	328 24 13.0	2 19 51.6	20.5	12 23 21.3	1 38 18.1	20.5	57 37 31.6	4 44 28.1
21.0	334 21 28.0	−1 50 48.9	21.0	18 18 41.4	+2 8 42.8	21.0	63 51 55.5	+4 58 6.9
21 5	340 17 5.0	1 20 39.4	21.5	24 15 38.0	2 37 52.8	21.5	70 10 28.6	5 8 19.9
22.0	346 11 29.6	0 49 41.4	22.0	30 14 42.6	3 5 30.1	22.0	76 33 36.2	5 14 52.8
22.5	352 5 10.6	−0 18 12.9	22.5	36 16 28.2	3 31 16.8	22.5	83 1 42.7	5 17 32.8
23.0	357 58 39.2	+0 13 28.1	23.0	42 21 28.7	3 54 54.9	23.0	89 35 10.8	5 16 8.9
23.5	3 52 28.9	+0 45 4.1	23.5	48 30 18.4	+4 16 6.3	23.5	96 14 20.6	+5 10 31.6
24.0	9 47 15.7	1 16 17.4	24.0	54 43 31.3	4 34 32.8	24.0	102 59 29.0	5 0 33.9
24.5	15 43 37.3	1 46 50.4	24.5	61 1 40.7	4 49 56.4	24.5	109 50 48.2	4 46 12.2
25.0	21 42 12.3	2 16 25.1	25.0	67 25 18.5	5 1 58.8	25.0	116 48 24.4	4 27 26.7
25.5	27 43 40.0	2 44 43.4	25.5	73 54 52.9	5 10 22.3	25.5	123 52 16.5	4 4 22.5
26.0	33 48 39.8	+3 11 26.8	26.0	80 30 48.4	+5 14 50.2	26.0	131 2 15.5	+3 37 10.5
26.5	39 57 50.5	3 36 15.8	26.5	87 13 24.4	5 15 6.9	26.5	138 18 3.5	3 6 7.9
27.0	46 11 49.0	3 58 50.4	27.0	94 2 53.3	5 10 59.0	27.0	145 39 12.5	2 31 38.8
27.5	52 31 9.8	4 18 50.0	27.5	100 59 20.1	5 2 16.3	27.5	153 5 4.2	1 54 14.4
28.0	58 56 23.7	4 35 53.7	28.0	108 2 40.1	4 48 52.7	28.0	160 34 50.9	1 14 32.8
28.5	65 27 56.2	+4 49 40.4	28.5	115 12 38.1	+4 30 47.5	28.5	168 7 36.6	+0 33 17.8
29.0	72 6 6.5	4 59 49.1	29.0	122 28 48.8	4 8 6.2	29.0	175 42 17.6	−0 8 42.2
29.5	78 51 6.3	5 6 0.1	29.5	129 50 35.8	3 41 1.8	29.5	183 17 44.4	0 50 36.4
30.0	85 42 58.9	5 7 55.8	30.0	137 17 11.9	3 9 55.0	30.0	190 52 45.3	1 31 33.3
30.5	92 41 37.2	5 5 21.1	30.5	144 47 40.6	2 35 14.6	30.5	198 26 8.8	2 10 43.7
31.0	99 46 43.5	+4 58 5.3	31.0	152 20 58.2	+1 57 37.1	31.0	205 56 45.4	−2 47 22.1
31.5	106 57 49.5	+4 46 3.0	31.5	159 55 55.5	+1 17 45.3	31.5	213 23 30.9	−3 20 49.0

MOON'S LONGITUDE AND LATITUDE, 1913.

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	OCTOBER.		Day of Month.	NOVEMBER.		Day of Month.	DECEMBER.	
	True Long.	Latitude.		True Long.	Latitude.		True Long.	Latitude.
	° ′ ″	° ′ ″		° ′ ″	° ′ ″		° ′ ″	° ′ ″
1.0	205 56 45.4	−2 47 22.1	1.0	257 23 22.4	−5 7 9.3	1.0	292 6 34.2	−4 17 10.0
1.5	213 23 30.9	3 20 49.0	1.5	264 16 20.3	5 8 37.8	1.5	298 33 25.2	3 57 47.7
2.0	220 45 29.3	3 50 32.1	2.0	271 2 25.0	5 5 43.8	2.0	304 54 29.2	3 35 43.2
2.5	228 1 53.9	4 16 6.9	2.5	277 41 37.2	4 58 43.0	2.5	311 10 7.8	3 11 18.9
3.0	235 12 7.5	4 37 16.7	3.0	284 14 6.9	4 47 53.1	3.0	317 20 48.5	2 44 56.6
3.5	242 15 44.0	−4 53 52.1	3.5	290 40 12.0	−4 33 33.5	3.5	323 27 3.9	−2 16 57.6
4.0	249 12 28.7	5 5 50.5	4.0	297 0 17.4	4 16 4.3	4.0	329 29 30.1	1 47 42.0
4.5	256 2 16.8	5 13 14.8	4.5	303 14 53.1	3 55 45.6	4.5	335 28 46.2	1 17 29.1
5.0	262 45 12.5	5 16 12.3	5.0	309 24 33.1	3 32 57.3	5.0	341 25 33.2	0 46 37.2
5.5	269 21 28.0	5 14 54.0	5.5	315 29 54.6	3 7 58.8	5.5	347 20 33.4	−0 15 24.2
6.0	275 51 22.2	−5 9 33.3	6.0	321 31 36.8	−2 41 9.1	6.0	353 14 29.3	+0 15 52.8
6.5	282 15 19.4	5 0 25.1	6.5	327 30 19.5	2 12 46.3	6.5	359 8 3.1	0 46 57.0
7.0	288 33 48.0	4 47 45.6	7.0	333 26 42.9	1 43 8.5	7.0	5 1 56.1	1 17 31.5
7.5	294 47 19.0	4 31 51.5	7.5	339 21 26.9	1 12 33.2	7.5	10 56 48.4	1 47 19.5
8.0	300 56 25.7	4 12 59.9	8.0	345 15 10.1	0 41 17.6	8.0	16 53 17.6	2 16 3.8
8.5	307 1 42.2	−3 51 27.9	8.5	351 8 29.5	−0 9 39.2	8.5	22 51 58.9	+2 43 27.0
9.0	313 3 42.7	3 27 32.7	9.0	357 2 0.0	+0 22 4.5	9.0	28 53 23.9	3 9 11.3
9.5	319 3 1.1	3 1 31.5	9.5	2 56 14.3	0 53 35.6	9.5	34 58 0.6	3 32 58.4
10.0	325 0 10.4	2 33 41.5	10.0	8 51 42.0	1 24 35.9	10.0	41 6 12.9	3 54 29.9
10.5	330 55 42.0	2 4 20.2	10.5	14 48 49.9	1 54 46.8	10.5	47 18 19.8	4 13 27.4
11.0	336 50 5.9	−1 33 45.2	11.0	20 48 1.4	+2 23 49.3	11.0	53 34 35.1	+4 29 32.7
11.5	342 43 50.1	1 2 14.6	11.5	26 49 36.3	2 51 24.3	11.5	59 55 7.3	4 42 28.6
12.0	348 37 20.6	−0 30 6.5	12.0	32 53 51.1	3 17 12.2	12.0	66 19 59.3	4 51 58.9
12.5	354 31 1.1	+0 2 20.5	12.5	39 0 59.0	3 40 53.6	12.5	72 49 8.8	4 57 49.3
13.0	0 25 13.6	0 34 47.3	13.0	45 11 9.2	4 2 9.7	13.0	79 22 27.9	4 59 48.0
13.5	6 20 17.9	+1 6 54.5	13.5	51 24 27.8	+4 20 42.2	13.5	85 59 44.4	+4 57 46.1
14.0	12 16 31.6	1 38 22.4	14.0	57 40 58.0	4 36 14.0	14.0	92 40 42.1	4 51 38.5
14.5	18 14 10.6	2 8 51.4	14.5	64 0 40.3	4 48 29.3	14.5	99 25 1.8	4 41 23.9
15.0	24 13 29.5	2 38 1.7	15.0	70 23 32.9	4 57 14.1	15.0	106 12 22.5	4 27 5.4
15.5	30 14 41.5	3 5 33.7	15.5	76 49 32.8	5 2 17.0	15.5	113 2 21.8	4 8 50.8
16.0	36 17 58.4	+3 31 8.3	16.0	83 18 35.9	+5 3 29.1	16.0	119 54 38.0	+3 46 52.5
16.5	42 23 31.2	3 54 26.9	16.5	89 50 37.3	5 0 44.1	16.5	126 48 50.7	3 21 27.0
17.0	48 31 30.5	4 15 11.7	17.0	96 25 32.7	4 53 59.0	17.0	133 44 41.2	2 52 55.0
17.5	54 42 6.8	4 33 5.9	17.5	103 3 18.5	4 43 14.1	17.5	140 41 53.5	2 21 40.9
18.0	60 55 30.6	4 47 54.0	18.0	109 43 52.1	4 28 33.1	18.0	147 40 14.5	1 48 12.4
18.5	67 11 52.6	+4 59 21.8	18.5	116 27 12.7	+4 10 3.2	18.5	154 39 34.2	+1 12 59.7
19.0	73 31 24.1	5 7 16.8	19.0	123 13 20.6	3 47 55.0	19.0	161 39 45.3	+0 36 34.9
19.5	79 54 17.0	5 11 28.1	19.5	130 2 17.1	3 22 22.8	19.5	168 40 42.3	−0 0 28.4
20.0	86 20 43.9	5 11 46.8	20.0	136 54 4.8	2 53 44.3	20.0	175 42 21.2	0 37 35.6
20.5	92 50 57.9	5 8 6.2	20.5	143 48 46.8	2 22 20.7	20.5	182 44 38.1	1 14 11.9
21.0	99 25 12.4	+5 0 22.0	21.0	150 46 25.7	+1 48 36.7	21.0	189 47 28.9	−1 49 42.6
21.5	106 3 40.6	4 48 32.4	21.5	157 47 2.2	1 13 0.2	21.5	196 50 47.8	2 23 33.9
22.0	112 46 35.0	4 32 38.8	22.0	164 50 34.8	+0 36 2.1	22.0	203 54 26.4	2 55 13.6
22.5	119 34 6.9	4 12 45.8	22.5	171 56 58.9	−0 1 43.4	22.5	210 58 12.8	3 24 11.5
23.0	126 26 25.3	3 49 1.8	23.0	179 6 5.3	0 39 40.1	23.0	218 1 51.7	3 49 59.8
23.5	133 23 36.3	+3 21 39.4	23.5	186 17 38.9	−1 17 10.0	23.5	225 5 3.5	−4 12 14.2
24.0	140 25 41.7	2 50 56.0	24.0	193 31 18.2	1 53 34.0	24.0	232 7 24.8	4 30 34.6
24.5	147 32 37.7	2 17 13.9	24.5	200 46 35.1	2 28 13.3	24.5	239 8 28.5	4 44 45.2
25.0	154 44 14.5	1 41 0.3	25.0	208 2 54.9	3 0 30.2	25.0	246 7 45.0	4 54 35.2
25.5	162 0 14.5	1 2 48.0	25.5	215 19 36.5	3 29 49.6	25.5	253 4 42.8	4 59 59.1
26.0	169 20 11.9	+0 23 14.5	26.0	222 35 53.4	−3 55 40.1	26.0	259 58 50.2	−5 0 56.5
26.5	176 43 32.6	−0 16 58.8	26.5	229 50 56.0	4 17 35.4	26.5	266 49 36.9	4 57 32.3
27.0	184 9 33.8	0 57 7.3	27.0	237 3 52.6	4 35 15.1	27.0	273 36 34.6	4 49 56.2
27.5	191 37 24.7	1 36 24.3	27.5	244 13 52.0	4 48 25.2	27.5	280 19 19.1	4 38 21.8
28.0	199 6 7.7	2 14 3.4	28.0	251 20 6.0	4 56 58.5	28.0	286 57 31.0	4 23 6.6
28.5	206 34 40.3	−2 49 20.6	28.5	258 21 50.8	−5 0 54.3	28.5	293 30 56.5	−4 4 30.8
29.0	214 1 57.3	3 21 35.6	29.0	265 18 29.4	5 0 18.2	29.0	299 59 28.3	3 42 56.2
29.5	221 26 53.3	3 50 13.4	29.5	272 9 32.7	4 55 20.9	29.5	306 23 5.2	3 18 46.1
30.0	228 48 25.4	4 14 45.9	30.0	278 54 40.5	4 46 17.9	30.0	312 41 52.7	2 52 24.2
30.5	236 5 35.9	4 34 52.8	30.5	285 33 41.6	4 33 27.4	30.5	318 56 2.8	2 24 14.0
31.0	243 17 34.7	−4 50 21.3	31.0	292 6 34.2	−4 17 10.0	31.0	325 5 52.9	−1 54 38.6
31.5	250 23 40.6	−5 1 6.3	31.5	298 33 25.2	−3 57 47.7	31.5	331 11 45.6	−1 24 0.1

GREENWICH MEAN NOON.

Date.	MOON'S EQUATOR.					
	i Inclination to the Earth's Equator	Δ Ascending Node on Earth's Equator to Ascending Node on Ecliptic.	☊′ Ascending Node on Earth's Equator.	Γ' Longitude of the Moon's Perigee. Daily Motion +6′.684.	☊ Mean Longitude of Moon's Ascending Node. Daily Motion, −3′.177.	☾ Moon's Mean Longitude.
	° ′	° ′	° ′	° ′	° ′	° ′
Jan. 0	21 56.0	188 16.0	359 26.7	143 16.4	7 45.3	191 58.7
10	21 55.9	187 42.1	359 29.0	144 23.2	7 13.5	323 44.6
20	21 55.8	187 8.3	359 31.2	145 30.1	6 41.8	95 30.4
30	21 55.7	186 34.4	359 33.5	146 36.9	6 10.0	227 16.2
Feb. 9	21 55.6	186 0.6	359 35.8	147 43.8	5 38.2	359 2.1
19	21 55.5	185 26.7	359 38.0	148 50.6	5 6.4	130 47.9
Mar. 1	21 55.4	184 52.8	359 40.3	149 57.4	4 34.7	262 33.8
11	21 55.3	184 19.0	359 42.6	151 4.3	4 2.9	34 19.6
21	21 55.3	183 45.1	359 44.9	152 11.1	3 31.1	166 5.4
31	21 55.2	183 11.2	359 47.1	153 18.0	2 59.4	297 51.3
Apr. 10	21 55.2	182 37.3	359 49.4	154 24.8	2 27.6	69 37.1
20	21 55.1	182 3.4	359 51.7	155 31.7	1 55.8	201 23.0
30	21 55.1	181 29.6	359 54.0	156 38.5	1 24.0	333 8.8
May 10	21 55.1	180 55.7	359 56.3	157 45.3	0 52.3	104 54.6
20	21 55.1	180 21.8	359 58.5	158 52.2	0 20.5	236 40.5
30	21 55.1	179 48.0	0 0.8	159 59.0	359 48.7	8 26.3
June 9	21 55.1	179 14.1	0 3.1	161 5.9	359 16.9	140 12.1
19	21 55.1	178 40.2	0 5.4	162 12.7	358 45.2	271 58.0
29	21 55.1	178 6.4	0 7.6	163 19.6	358 13.4	43 43.8
July 9	21 55.2	177 32.5	0 9.9	164 26.4	357 41.6	175 29.7
19	21 55.2	176 58.6	0 12.2	165 33.2	357 9.9	307 15.5
29	21 55.2	176 24.8	0 14.5	166 40.1	356 38.1	79 1.3
Aug. 8	21 55.3	175 50.9	0 16.8	167 46.9	356 6.3	210 47.2
18	21 55.4	175 17.0	0 19.0	168 53.8	355 34.5	342 33.0
28	21 55.5	174 43.2	0 21.3	170 0.6	355 2.8	114 18.9
Sept. 7	21 55.5	174 9.3	0 23.6	171 7.5	354 31.0	246 4.7
17	21 55.6	173 35.4	0 25.8	172 14.3	353 59.2	17 50.5
27	21 55.7	173 1.6	0 28.1	173 21.1	353 27.4	149 36.4
Oct. 7	21 55.8	172 27.7	0 30.4	174 28.0	352 55.7	281 22.2
17	21 55.9	171 53.8	0 32.6	175 34.8	352 23.9	53 8.0
27	21 56.1	171 20.0	0 34.9	176 41.7	351 52.1	184 53.9
Nov. 6	21 56.2	170 46.1	0 37.1	177 48.5	351 20.4	316 39.7
16	21 56.3	170 12.3	0 39.4	178 55.3	350 48.6	88 25.6
26	21 56.5	169 38.5	0 41.6	180 2.2	350 16.8	220 11.4
Dec. 6	21 56.6	169 4.6	0 43.8	181 9.0	349 45.0	351 57.2
16	21 56.8	168 30.8	0 46.1	182 15.9	349 13.3	123 43.1
26	21 57.0	167 57.0	0 48.3	183 22.7	348 41.5	255 28.9
36	21 57.2	167 23.2	0 50.5	184 29.6	348 9.7	27 14.7

Mean Solar Days.	Motion of Moon in Mean Longitude.
	° ′
0.1	1 19.06
0.2	2 38.12
0.3	3 57.18
0.4	5 16.23
0.5	6 35.29
0.6	7 54.35
0.7	9 13.41
0.8	10 32.47
0.9	11 51.53
1.0	13 10.58
2.0	26 21.17
3.0	39 31.75
4.0	52 42.33
5.0	65 52.92
6.0	79 3.50
7.0	92 14.09
8.0	105 24.67
9.0	118 35.25
10.0	131 45.84
Hours.	° ′
1	0 32.94
2	1 5.88
3	1 38.82
4	2 11.76
5	2 44.70
6	3 17.65
7	3 50.59
8	4 23.53
9	4 56.47
10	5 29.41
11	6 2.35
12	6 35.29
13	7 8.23
14	7 41.17
15	8 14.11
16	8 47.06
17	9 20.00
18	9 52.94
19	10 25.88
20	10 58.82
21	11 31.76
22	12 4.70
23	12 37.64

QUANTITIES REQUIRED IN COMPUTING THE MOON'S LIBRATION.

ARGUMENT, (☊ − λ), or (☊ − λ − 180°).

☊ − λ	μ	$\frac{1}{A}$	B	☊ − λ
°	′		° ′	°
0	0.0	37	0 0.0	180
2	0.0	37	0 3.2	178
4	0.1	37	0 6.4	176
6	0.1	38	0 9.6	174
8	0.2	38	0 12.8	172
10	0.2	38	0 16.0	170
12	0.3	38	0 19.2	168
14	0.3	38	0 22.3	166
16	0.3	39	0 25.4	164
18	0.4	39	0 28.5	162
20	0.4	40	0 31.5	160
22	0.4	40	0 34.5	158
24	0.5	41	0 37.5	156
26	0.5	42	0 40.4	154
28	0.5	42	0 43.2	152
30	0.5	43	0 46.1	150
32	0.6	44	0 48.8	148
34	0.6	45	0 51.5	146
36	0.6	46	0 54.1	144
38	0.6	47	0 56.7	142
40	0.6	49	0 59.2	140
42	0.6	50	1 1.6	138
44	0.6	52	1 4.0	136
46	0.6	54	1 6.3	134
48	0.6	56	1 8.5	132
50	0.6	58	1 10.6	130
52	0.6	61	1 12.6	128
54	0.6	64	1 14.5	126
56	0.6	67	1 16.4	124
58	0.6	70	1 18.1	122
60	0.5	75	1 19.8	120
62	0.5	80	1 21.3	118
64	0.5	85	1 22.8	116
66	0.5	92	1 24.1	114
68	0.4	100	1 25.4	112
70	0.4	109	1 26.5	110
72	0.4	121	1 27.6	108
74	0.3	135	1 28.5	106
76	0.3	154	1 29.4	104
78	0.3	180	1 30.1	102
80	0.2	215	1 30.7	100
82	0.2	268	1 31.2	98
84	0.1	357	1 31.6	96
86	0.1	535	1 31.9	94
88	0.0	1070	1 32.0	92
90	0.0	∞	1 32.1	90

μ has the sign of tan (λ − ☊)
A has the sign of cos (☊ − λ)
B has the sign of sin (☊ − λ)
See formulæ, page xi.

SUN'S ABERRATION AND HORIZONTAL PARALLAX.

FOR GREENWICH MEAN NOON.

Date.	Aberration.	Hor. Par.
1913.	″	″
Jan. 0	−20.81	8.95
10	20.81	8.95
20	20.80	8.94
30	20.77	8.93
Feb. 9	20.74	8.92
19	−20.70	8.90
Mar. 1	20.65	8.88
11	20.59	8.86
21	20.54	8.83
31	20.48	8.81
Apr. 10	−20.42	8.78
20	20.36	8 76
30	20.31	8.73
May 10	20.26	8.71
20	20.22	8.69
30	−20.18	8.68
June 9	20.15	8.67
19	20.14	8.66
29	20.13	8.65
July 9	20.13	8.66
19	−20.14	8.66
29	20.16	8.67
Aug. 8	20.18	8.68
18	20.22	8.70
28	20.26	8.72
Sept. 7	−20.31	8.74
17	20.37	8.76
27	20.42	8.78
Oct. 7	20.48	8.81
17	20.54	8.83
27	−20.60	8.86
Nov. 6	20.65	8.88
16	20.70	8.90
26	20.74	8.92
Dec. 6	20.77	8.93
16	−20.80	8.94
26	20.81	8.95
36	−20.81	8.95

Sun's Mean Equatorial Horizontal Parallax.

8″.80; log=0.94448.

PRECESSION AND OBLIQUITY, 1913.

(CONSTANTS OF PARIS CONFERENCE.)

FOR GREENWICH MEAN NOON.

Date.	Precession in Longitude from 1913.0.	Nutation.			Obliquity of Ecliptic. (*Newcomb.*)
		δ′ψ In Longitude.	δ′α In R. A.	δ′ω In Obliquity.	
	"	"	s	"	23° 27′ "
Jan. 0	– 0.06	−1.86	−0.114	+8.52	10.69
5	+ 0.63	1.56	0.095	8.57	10.73
10	1.32	1.28	0.078	8.63	10.78
15	2.00	1.03	0.063	8.70	10.85
20	2.69	0.81	0.050	8.78	10.92
25	+ 3.38	−0.63	−0.039	+8.87	11.01
30	4.07	0.48	0.029	8.97	11.10
Feb. 4	4.76	0.38	0.023	9.07	11.20
9	5.44	0.31	0.019	9.17	11.29
14	6.13	0.28	0.017	9.27	11.38
19	+ 6.82	−0.29	−0.018	+9.37	11.47
24	7.51	0.35	0.021	9.45	11.55
Mar. 1	8.20	0.42	0.026	9.52	11.61
6	8.88	0.51	0.031	9.58	11.66
11	9.57	0.63	0.039	9.62	11.70
16	+10.26	−0.77	−0.047	+9.64	11.72
21	10.95	0.90	0.055	9.65	11.72
26	11.63	1.04	0.064	9.65	11.71
31	12.32	1.17	0.072	9.62	11.68
Apr. 5	13.01	1.29	0.079	9.58	11.63
10	+13.70	−1.39	−0.085	+9.53	11.57
15	14.39	1.47	0.090	9.47	11.51
20	15.07	1.52	0.093	9.40	11.43
25	15.76	1.54	0.094	9.32	11.34
30	16.45	1.52	0.093	9.23	11.24
May 5	+17.14	−1.47	−0.090	+9.14	11.15
10	17.83	1.38	0.084	9.04	11.05
15	18.51	1.26	0.077	8.95	10.95
20	19.20	1.11	0.068	8.87	10.86
25	19.89	0.93	0.057	8.80	10.78
30	+20.58	−0.72	−0.044	+8.73	10.71
June 4	21.26	0.49	0.030	8.67	10.64
9	21.95	−0.24	−0.015	8.63	10.59
14	22.64	+0.02	+0.001	8.60	10.56
19	23.33	0.29	0.018	8.59	10.54
24	+24.02	+0.56	+0.034	+8.59	10.53
29	24.70	0.83	0.051	8.60	10.54
July 4	+25.39	+1.09	+0.067	+8.63	10.57
July 4	+25.39	+1.09	+0.067	+8.63	10.57
9	26.08	1.35	0.083	8.68	10.60
14	26.77	1.57	0.096	8.74	10.65
19	27.46	1.77	0.108	8.80	10.71
24	28.14	1.96	0.120	8.86	10.77
29	+28.83	+2.11	+0.129	+8.94	10.84
Aug. 3	29.52	2.23	0.136	9.03	10.92
8	30.21	2.31	0.141	9.12	11.00
13	30.89	2.35	0.144	9.20	11.08
18	31.58	2.37	0.145	9.29	11.16
23	+32.27	+2.36	+0.144	+9.36	11.23
28	32.96	2.31	0.141	9.44	11.30
Sept. 2	33.65	2.23	0.136	9.50	11.36
7	34.33	2.14	0.131	9.56	11.40
12	35.02	2.03	0.124	9.59	11.43
17	+35.71	+1.90	+0.116	+9.61	11.45
22	36.40	1.76	0.108	9.61	11.44
27	37.09	1.61	0.099	9.60	11.42
Oct. 2	37.77	1.47	0.090	9.58	11.39
7	38.46	1.35	0.083	9.54	11.35
12	+39.15	+1.25	+0.077	+9.48	11.29
17	39.84	1.17	0.072	9.42	11.22
22	40.53	1.11	0.068	9.34	11.13
27	41.21	1.09	0.067	9.25	11.04
Nov. 1	41.90	1.10	0.067	9.15	10.93
6	+42.59	+1.16	+0.071	+9.04	10.82
11	43.28	1.25	0.077	8.94	10.71
16	43.96	1.38	0.084	8.84	10.60
21	44.65	1.54	0.094	8.74	10.50
26	45.34	1.75	0.107	8.65	10.41
Dec. 1	+46.03	+1.99	+0.122	+8.57	10.32
6	46.72	2.26	0.138	8.50	10.24
11	47.40	2.55	0.156	8.45	10.18
16	48.09	2.85	0.174	8.42	10.14
21	48.78	3.16	0.193	8.40	10.12
26	+49.47	+3.47	+0.212	+8.40	10.11
31	50.16	3.77	0.231	8.42	10.12
36	+50.84	+4.07	+0.249	+8.45	10.14

	"	
Precession for 1913 . .	50.2593	log=1.70122
Precession in a Solar day	0.1376	log=9.13862
Precession in a Sidereal day	0.1372	log=9.13735

The short period terms of the Nutation are given for Washington midnight on pp. 231–232.

Mean Obliquity, 1913.0.	°	′	"
Newcomb	23	27	2.17
Hansen	23	27	1.94
Le Verrier	23	27	1.85
Peters	23	27	1.73

PART II.

ASTRONOMICAL EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.

FORMULÆ FOR THE REDUCTION OF STARS

FROM MEAN TO APPARENT PLACE FOR THE YEAR 1913.

The constants of precession, nutation and aberration adopted by the *Conférence Internationale des Étoiles Fondamentales* which met in Paris in May, 1896, are given on page xiv, and together with the notation of Bessel are used in the formulæ which follow.

BESSELIAN STAR-NUMBERS.

Terms of Long Period.	*Terms of Short Period.*
$A=\tau-0.342\,19\sin\text{☊}$	$-0.004\,05\sin 2\text{☾}$
$+0.004\,15\sin 2\text{☊}$	$+0.000\,23\sin(\text{☾}+\Gamma')$
$-0.025\,26\sin 2\mathrm{L}$	$+0.001\,34\sin(\text{☾}-\Gamma')$
$+0.002\,51\sin(\mathrm{L}-\Gamma)$	$-0.000\,68\sin(2\text{☾}-\text{☊})$
$-0.000\,99\sin(3\mathrm{L}-\Gamma)$	$-0.000\,52\sin(3\text{☾}-\Gamma')$
$+0.000\,42\sin(\mathrm{L}+\Gamma)$	$+0.000\,30\sin(\text{☾}-2\mathrm{L}+\Gamma')$
$+0.000\,25\sin(2\mathrm{L}-\text{☊})$	$+0.000\,12\sin 2(\text{☾}-\mathrm{L})$
″ .	″
$B=-9.210\cos\text{☊}$	$-0.088\cos 2\text{☾}$
$+0.090\cos 2\text{☊}$	$-0.018\cos(2\text{☾}-\text{☊})$
$-0.552\cos 2\mathrm{L}$	$-0.011\cos(3\text{☾}-\Gamma')$
$-0.022\cos(3\mathrm{L}-\Gamma)$	$+0.005\cos(\text{☾}+\Gamma')$
$+0.009\cos(\mathrm{L}+\Gamma)$	
$+0.007\cos(2\mathrm{L}-\text{☊})$	

$$C=-20.4700\cos\omega\cos\odot$$
$$D=-20.4700\sin\odot$$
$$E=-0.0419\sin\text{☊}+0''.0005\sin 2\text{☊}-0''.0031\sin 2\mathrm{L}$$

BESSEL'S *Star-Constants.*

$a=3^s.072\,58+1^s.336\,39\sin\alpha_0\tan\delta_0$	$a'=20''.0457\cos\alpha_0$
$b=\frac{1}{15}\cos\alpha_0\tan\delta_0$	$b'=-\sin\alpha_0$
$c=\frac{1}{15}\cos\alpha_0\sec\delta_0$	$c'=\tan\omega\cos\delta_0-\sin\alpha_0\sin\delta_0$
$d=\frac{1}{15}\sin\alpha_0\sec\delta_0$	$d'=\cos\alpha_0\sin\delta_0$

Formulæ for Reduction to Apparent Position.

$$*\,\alpha=\alpha_0+\tau\mu+Aa+Bb+Cc+Dd+\tfrac{1}{15}E \qquad \text{(in time)}$$
$$\delta=\delta_0+\tau\mu'+Aa'+Bb'+Cc'+Dd' \qquad \text{(in arc)}$$

INDEPENDENT STAR-NUMBERS.

$$f+f'=+46''.0886\,A+E\ \text{(in arc)}=3^s.072\,58\,A+\tfrac{1}{15}E \qquad \text{(in time)}$$
$$f'=-0^s.0124\sin 2\text{☾}+0^s.0041\sin(\text{☾}-\Gamma')+0^s.0007\sin(\text{☾}+\Gamma')$$
$$-0^s.0021\sin(2\text{☾}-\text{☊})-0^s.0016\sin(3\text{☾}-\Gamma')$$
$$+0^s.0009\sin(\text{☾}-2\mathrm{L}+\Gamma')+0^s.0004\sin 2(\text{☾}-\mathrm{L})$$

$g\sin G=B$ $\qquad$ $h\sin H=C$ $\qquad$ $i=C\tan\omega$

$g\cos G=20''.0457\,A$ $\qquad$ $h\cos H=D$

Formulæ for Reduction to Apparent Position.

$$*\,\alpha=\alpha_0+f+f'+\tau\mu+\tfrac{1}{15}\,g\sin(G+\alpha_0)\tan\delta_0+\tfrac{1}{15}\,h\sin(H+\alpha_0)\sec\delta_0 \qquad \text{(in time)}$$
$$\delta=\delta_0+\tau\mu'+g\cos(G+\alpha_0)+h\cos(H+\alpha_0)\sin\delta_0+i\cos\delta_0 \qquad \text{(in arc)}$$

In the above formulæ,

τ denotes the time reckoned in units of one year, from the beginning of the Besselian fictitious year (1913, January $0^d.248$, Washington mean time),

α_0, δ_0, the star's mean R. A. and Decl. at the beginning of the fictitious year,

α, δ, the star's apparent right ascension and declination at the time τ,

μ, μ', the annual proper motion in right ascension and declination,

$\odot$, the Sun's true longitude,

L, the Sun's mean longitude,

☊, the longitude of the Moon's ascending node,

ω, the obliquity of the ecliptic,

Γ, the long. of the Sun's perigee,

Γ', the long. of the Moon's perigee,

☾, the Moon's mean longitude.

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* See page 217 for statement concerning the use of these formulæ.

The independent star-numbers are more convenient than BESSEL'S, when only one or two apparent positions of a star are required, or when BESSEL'S star-constants are not known with sufficient accuracy.

In using the star-constants of the *British Association Catalogue*, $a, b, c, d, a', b', c', d'$, with the star-numbers of this Ephemeris, the quantities to be computed are $Ac, Bd, Ca, Db, -Ac', -Bd', -Ca', -Db'$.

In the computation of the independent star-numbers given for Washington mean midnight of each day of the year, on pages 222–229, the short-period terms—that is, the terms involving the Moon's mean longitude—have been included in the two columns headed G and Log g. The quantities f and f' correspond to f' and f'', respectively, as given on the page of constants in Part IV of the American Ephemeris for the years 1901 to 1911, inclusive, and are tabulated in the third and fourth columns, respectively, giving separately the effect of the long-period and short-period terms. f' differs but slightly from the term $-0''.1866 \sin 2 ☾ + 0''.0622 \sin (☾ - \Gamma')$ given on page 37 of the *Procès-Verbaux* of the Paris Conference, and also on page 289 of the American Ephemeris and Nautical Almanac for 1900. In computing the reduction of stars from mean to apparent place, or vice versa, using the independent star-numbers, the quantity f' (which is the same for all stars) should be omitted in using the formulæ for α on page 216, in case it is desired to make the reduction in conformity with the decision of the Paris Conference with reference to this matter. See page of *Procès-Verbaux* above cited.

In the computation of the Besselian star-numbers, pages 218–221, all short-period terms have been included, and hence in using these quantities in the reduction of stars to apparent place by means of the formulæ for that purpose on page 216, f' must be subtracted from the final result if it is desired, in compliance with the decision of the Paris Conference, to omit that quantity.

In computing the ephemerides of the circumpolar stars in this volume, all short-period terms have been included, excepting the quantity f' above mentioned. which has been omitted.

In the computation of the ephemerides of the ten-day stars, no short-period terms have been included. These terms attain two maxima and two minima during the tropical month. At maximum and minimum they may amount in right ascension to $\pm 0^s.008 \tan \delta$, and in declination to $\pm 0''.13$. For computing the effect of these terms for the correction of the positions of stars interpolated from the ten-day ephemerides, the following formulæ may be used, in which $\Delta\alpha$ and $\Delta\delta$ denote the effect of the short-period terms in right ascension and declination, respectively, and $\delta''\psi$ and $\delta''\omega$, the sum of the short-period terms of the nutation in longitude and obliquity:

$$\Delta\alpha = D'_\psi\alpha \ \delta''\psi + D_\omega\alpha \ \delta''\omega$$
$$\Delta\delta = D_\psi\delta \ \delta''\psi + D_\omega\delta \ \delta''\omega$$

The values of $\delta''\psi$ and of $\delta''\omega$ for Washington mean midnight are given for each day of the year on pages 231–232, and have been computed as follows:

$$\delta''\psi = 50''.37 \, A_2 \qquad\qquad \delta''\omega = -B_2$$

in which A_2 and B_2 are the sums of the short-period terms given in the expressions for A and B on page 216.

The quantities $D'_\psi\alpha$, $D_\omega\alpha$, $D_\psi\delta$, and $D_\omega\delta$ are given for each ten-day star on pages 287–486, and have been computed by means of the following formulæ:

$$D'_\psi\alpha = \tfrac{1}{15} \sin\alpha \tan\delta \sin\omega \qquad\qquad D_\omega\alpha = -\tfrac{1}{15} \cos\alpha \tan\delta$$
$$D_\psi\delta = \cos\alpha \sin\omega \qquad\qquad D_\omega\delta = \sin\alpha$$

The complete derivative of the right ascension with reference to ψ is

$$D_\psi\alpha = \tfrac{1}{15} (\cos\omega + \sin\alpha \tan\delta \sin\omega)$$

and the omission of the term $\tfrac{1}{15} \cos\omega$ is made in accordance with the above-mentioned decision of the Paris Conference with reference to the quantity f'.

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)		Log *A*.	Log *B*.	Log *C*.	Log *D*.	Solar Day. (Sid. Hr.)		Log *A*.	Log *B*.	Log *C*.	Log *D*.
Jan.	0	−8.57680	−0.9340	−0.52236	+1.30418	Feb.	15	+9.07306	−0.9636	−1.19705	+1.04775
	1	8.54120	0.9321	0.56321	1.30272		16	9.09191	0.9644	1.20193	1.03576
	2	8.48841	0.9300	0.60041	1.30111		17	9.10944	0.9665	1.20662	1.02330
	3	8.41397	0.9283	0.63456	1.29936		18	9.12392	0.9694	1.21112	1.01034
	4	8.31048	0.9273	0.66609	1.29747	h (10.0)	19	9.13440	0.9727	1.21545	0.99686
h (7.0)	5	−8.16761	−0.9275	−0.69536	+1.29542		20	+9.14087	−0.9758	−1.21959	+0.98280
	6	7.96095	0.9287	0.72265	1.29323		21	9.14423	0.9782	1.22356	0.96814
	7	−7.60853	0.9306	0.74819	1.29090		22	9.14585	0.9794	1.22737	0.95284
	8	+6.49136	0.9332	0.77218	1.28840		23	9.14749	0.9794	1.23100	0.93685
	9	7.59106	0.9360	0.79479	1.28576		24	9.15080	0.9784	1.23447	0.92012
	10	+7.82413	−0.9387	−0.81614	+1.28297		25	+9.15682	−0.9768	−1.23778	+0.90258
	11	7.94448	0.9409	0.83635	1.28001		26	9.16566	0.9752	1.24093	0.88418
	12	8.01995	0.9424	0.85554	1.27690		27	9.17661	0.9740	1.24392	0.86482
	13	8.07846	0.9430	0.87377	1.27363		28	9.18862	0.9736	1.24676	0.84443
	14	8.13704	0.9428	0.89114	1.27020	Mar.	1	9.20048	0.9742	1.24945	0.82292
	15	+8.20412	−0.9417	−0.90770	+1.26660		2	+9.21112	−0.9757	−1.25199	+0.80014
	16	8.28353	0.9401	0.92352	1.26283		3	9.21982	0.9777	1.25438	0.77597
	17	8.37088	0.9386	0.93865	1.25889		4	9.22638	0.9801	1.25662	0.75025
	18	8.45924	0.9376	0.95313	1.25478		5	9.23081	0.9824	1.25872	0.72279
	19	8.54133	0.9376	0.96701	1.25050		6	9.23335	0.9845	1.26067	0.69334
h (8.0)	20	+8.61257	−0.9389	−0.98032	+1.24603	h (11.0)	7	+9.23447	−0.9860	−1.26248	+0.66163
	21	8.66997	0.9414	0.99310	1.24138		8	9.23480	0.9867	1.26416	0.62729
	22	8.71307	0.9448	1.00538	1.23654		9	9.23507	0.9867	1.26569	0.58988
	23	8.74296	0.9484	1.01719	1.23151		10	9.23618	0.9858	1.26709	0.54882
	24	8.76223	0.9517	1.02855	1.22628		11	9.23900	0.9842	1.26835	0.50334
	25	+8.77404	−0.9539	−1.03948	+1.22086		12	+9.24415	−0.9823	−1.26948	+0.45240
	26	8.78269	0.9549	1.05001	1.21522		13	9.25178	0.9805	1.27046	0.39464
	27	8.79267	0.9547	1.06016	1.20938		14	9.26152	0.9793	1.27132	0.32786
	28	8.80702	0.9536	1.06994	1.20332		15	9.27219	0.9792	1.27204	0.24879
	29	8.82692	0.9521	1.07937	1.19703		16	9.28265	0.9800	1.27263	0.15196
	30	+8.85156	−0.9508	−1.08846	+1.19052		17	+9.29181	−0.9820	−1.27309	+0.02708
	31	8.87910	0.9502	1.09723	1.18377		18	9.29880	0.9844	1.27342	9.85103
Feb.	1	8.90682	0.9505	1.10569	1.17677		19	9.30320	0.9869	1.27361	9.55018
	2	8.93247	0.9518	1.11386	1.16952		20	9.30521	0.9887	1.27368	+6.58776
	3	8.95477	0.9539	1.12174	1.16202		21	9.30572	0.9896	1.27361	−9.54895
h (9.0)	4	+8.97280	−0.9566	−1.12934	+1.15425	h (12.0)	22	+9.30608	−0.9892	−1.27342	−9.85004
	5	8.98655	0.9595	1.13667	1.14620		23	9.30737	0.9878	1.27309	0.02598
	6	8.99638	0.9625	1.14375	1.13786		24	9.31044	0.9856	1.27264	0.15069
	7	9.00290	0.9650	1.15058	1.12922		25	9.31561	0.9832	1.27205	0.24731
	8	9.00706	0.9669	1.15716	1.12028		26	9.32267	0.9810	1.27134	0.32616
	9	+9.01009	−0.9679	−1.16351	+1.11100		27	+9.33086	−0.9796	−1.27049	−0.39272
	10	9.01339	0.9681	1.16964	1.10140		28	9.33931	0.9791	1.26952	0.45029
	11	9.01847	0.9675	1.17554	1.09144		29	9.34714	0.9795	1.26841	0.50097
	12	9.02670	0.9663	1.18122	1.08111		30	9.35378	0.9806	1.26717	0.54621
	13	9.03886	0.9650	1.18670	1.07040		31	9.35894	0.9821	1.26580	0.58704
	14	+9.05477	−0.9638	−1.19197	+1.05929	Apr.	1	+9.36260	−0.9838	−1.26430	−0.62423
	15	+9.07306	−0.9636	−1.19705	+1.04775		2	+9.36480	−0.9851	−1.26266	−0.65835

$E = 0''.00 = 0^s.000$

[Eph 13]

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.	Solar Day. (Sid. Hr.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.
Apr. 1	+9.36260	−0.9838	−1.26430	−0.62423	May 17	+9.54223	−0.9526	−1.01382	−1.23298
2	9.36480	0.9851	1.26266	0.65835	18	9.54588	0.9494	1.00253	1.23770
3	9.36584	0.9860	1.26089	0.68984	19	9.55083	0.9462	0.99082	1.24224
4	9.36624	0.9862	1.25898	0.71906	20	9.55678	0.9434	0.97867	1.24660
h 5	9.36652	0.9856	1.25694	0.74632	h 21	9.56327	0.9417	0.96604	1.25081
(13.0) 6	+9.36734	−0.9841	−1.25476	−0.77182	(16.0) 22	+9.56980	−0.9410	−0.95291	−1.25485
7	9.36923	0.9819	1.25244	0.79578	23	9.57587	0.9414	0.93925	1.25873
8	9.37276	0.9793	1.24998	0.81835	24	9.58108	0.9423	0.92503	1.26245
9	9.37809	0.9767	1.24738	0.83967	25	9.58529	0.9437	0.91020	1.26602
10	9.38518	0.9745	1.24464	0.85986	26	9.58856	0.9451	0.89473	1.26944
11	+9.39338	−0.9733	−1.24176	−0.87901	27	+9.59101	−0.9461	−0.87856	−1.27272
12	9.40178	0.9730	1.23873	0.89723	28	9.59286	0.9466	0.86165	1.27584
13	9.40944	0.9739	1.23555	0.91458	29	9.59445	0.9462	0.84392	1.27882
14	9.41554	0.9756	1.23222	0.93112	30	9.59616	0.9450	0.82532	1.28166
15	9.41981	0.9774	1.22875	0.94693	31	9.59836	0.9430	0.80577	1.28436
16	+9.42226	−0.9788	−1.22512	−0.96206	June 1	+9.60134	−0.9403	−0.78517	−1.28692
17	9.42339	0.9794	1.22133	0.97654	2	9.60530	0.9375	0.76344	1.28935
18	9.42408	0.9788	1.21739	0.99042	3	9.61031	0.9348	0.74041	1.29164
19	9.42535	0.9769	1.21328	1.00375	4	9.61621	0.9328	0.71599	1.29380
h 20	9.42791	0.9742	1.20901	1.01655	h 5	9.62261	0.9320	0.68998	1.29582
(14.0) 21	+9.43212	−0.9711	−1.20458	−1.02885	(17.0) 6	+9.62891	−0.9324	−0.66220	−1.29772
22	9.43792	0.9680	1.19997	1.04069	7	9.63454	0.9340	0.63240	1.29948
23	9.44484	0.9658	1.19519	1.05208	8	9.63912	0.9362	0.60029	1.30112
24	9.45220	0.9644	1.19023	1.06306	9	9.64250	0.9385	0.56548	1.30263
25	9.45933	0.9639	1.18509	1.07363	10	9.64479	0.9401	0.52753	1.30401
26	+9.46568	−0.9643	−1.17977	−1.08383	11	+9.64642	−0.9408	−0.48581	−1.30527
27	9.47092	0.9652	1.17425	1.09367	12	9.64798	0.9401	0.43954	1.30641
28	9.47490	0.9664	1.16854	1.10317	13	9.64994	0.9383	0.38762	1.30742
29	9.47772	0.9675	1.16263	1.11233	14	9.65271	0.9357	0.32853	1.30830
30	9.47964	0.9682	1.15651	1.12118	15	9.65657	0.9329	0.25998	1.30907
May 1	+9.48098	−0.9681	−1.15019	−1.12973	16	+9.66142	−0.9304	−0.17841	−1.30971
2	9.48212	0.9673	1.14364	1.13799	17	9.66686	0.9289	0.07778	1.31024
3	9.48350	0.9656	1.13688	1.14597	18	9.67238	0.9285	9.94641	1.31064
4	9.48561	0.9631	1.12988	1.15368	19	9.67759	0.9293	9.75703	1.31092
5	9.48889	0.9602	1.12264	1.16112	h 20	9.68220	0.9309	−9.41326	1.31108
h 6	+9.49356	−0.9571	−1.11516	−1.16832	(18.0) 21	+9.68607	−0.9330	+8.72922	−1.31112
(15.0) 7	9.49958	0.9543	1.10743	1.17527	22	9.68914	0.9351	9.56367	1.31104
8	9.50659	0.9523	1.09943	1.18199	23	9.69148	0.9370	9.83161	1.31083
9	9.51400	0.9514	1.09116	1.18849	24	9.69326	0.9384	9.99600	1.31051
10	9.52107	0.9518	1.08261	1.19476	25	9.69476	0.9390	0.11487	1.31007
11	+9.52714	−0.9531	−1.07377	−1.20082	26	+9.69623	−0.9387	+0.20801	−1.30951
12	9.53178	0.9548	1.06462	1.20666	27	9.69796	0.9377	0.28456	1.30882
13	9.53494	0.9563	1.05516	1.21231	28	9.70020	0.9360	0.34950	1.30802
14	9.53694	0.9572	1.04536	1.21776	29	9.70320	0.9339	0.40589	1.30709
15	9.53831	0.9569	1.03522	1.22302	30	9.70702	0.9319	0.45569	1.30604
16	+9.53985	−0.9553	−1.02471	−1.22809	July 1	+9.71160	−0.9304	+0.50025	−1.30486
17	+9.54223	−0.9526	−1.01382	−1.23298	2	+9.71669	−0.9299	+0.54055	−1.30357

E = 0″.00 = 0ˢ.000

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.	Solar Day. (Sid. Hr.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.
July 1	+9.71160	−0.9304	+0.50025	−1.30486	Aug. 16	+9.83026	−0.9686	+1.17987	−1.08365
2	9.71669	0.9299	0.54055	1.30357	17	9.83108	0.9709	1.18513	1.07356
3	9.72188	0.9307	0.57731	1.30214	18	9.83158	0.9725	1.19021	1.06309
4	9.72668	0.9327	0.61110	1.30060	19	9.83192	0.9734	1.19512	1.05224
h 5	9.73075	0.9356	0.64233	[illegible]29892	h 20	9.83229	0.9734	1.19985	1.04098
(19.0) 6	+9.73385	−0.9387	+0.67135	−1.29712	(22.0) 21	+9.83292	−0.9726	+1.20441	−1.02929
7	9.73599	0.9414	0.69844	1.29519	22	9.83398	0.9716	1.20880	1.01715
8	9.73743	0.9431	0.72383	1.29313	23	9.83558	0.9701	1.21304	1.00452
9	9.73859	0.9435	0.74770	1.29094	24	9.83778	0.9689	1.21710	0.99138
10	9.73993	0.9428	0.77021	1.28862	25	9.84051	0.9683	1.22102	0.97769
11	+9.74185	−0.9413	+0.79149	−1.28617	26	+9.84353	−0.9687	+1.22477	−0.96342
12	9.74458	0.9392	0.81167	1.28358	27	9.84654	0.9701	1.22838	0.94854
13	9.74810	0.9373	0.83083	1.28085	28	9.84922	0.9725	1.23183	0.93299
14	9.75219	0.9363	0.84907	1.27798	29	9.85128	0.9754	1.23514	0.91672
15	9.75651	0.9363	0.86646	1.27498	30	9.85267	0.9784	1.23830	0.89969
16	+9.76072	−0.9375	+0.88307	−1.27183	31	+9.85342	−0.9809	+1.24131	−0.88182
17	9.76447	0.9395	0.89895	1.26854	Sept. 1	9.85374	0.9823	1.24418	0.86304
18	9.76760	0.9421	0.91416	1.26510	2	9.85395	0.9824	1.24691	0.84328
19	9.77008	0.9449	0.92874	1.26151	3	9.85440	0.9814	1.24950	0.82244
20	9.77193	0.9476	0.94272	1.25777	h 4	9.85538	0.9796	1.25196	0.80041
h 21	+9.77328	−0.9497	+0.95616	−1.25388	(23.0) 5	+9.85698	−0.9777	+1.25427	−0.77705
(20.0) 22	9.77431	0.9511	0.96908	1.24982	6	9.85916	0.9761	1.25646	0.75223
23	9.77522	0.9518	0.98152	1.24561	7	9.86173	0.9753	1.25850	0.72575
24	9.77624	0.9516	0.99349	1.24123	8	9.86438	0.9755	1.26042	0.69742
25	9.77762	0.9507	1.00503	1.23668	9	9.86681	0.9766	1.26220	0.66695
26	+9.77954	−0.9493	+1.01615	−1.23197	10	+9.86883	−0.9785	+1.26385	−0.63403
27	9.78213	0.9479	1.02688	1.22708	11	9.87036	0.9808	1.26537	0.59826
28	9.78539	0.9468	1.03724	1.22200	12	9.87135	0.9830	1.26676	0.55912
29	9.78919	0.9466	1.04724	1.21675	13	9.87188	0.9849	1.26803	0.51595
30	9.79320	0.9474	1.05690	1.21130	14	9.87211	0.9861	1.26916	0.46783
31	+9.79703	−0.9495	+1.06624	−1.20566	15	+9.87216	−0.9867	+1.27017	−0.41353
Aug. 1	9.80036	0.9524	1.07526	1.19982	16	9.87220	0.9865	1.27105	0.35128
2	9.80292	0.9559	1.08398	1.19378	17	9.87243	0.9855	1.27180	0.27841
3	9.80467	0.9591	1.09242	1.18753	18	9.87301	0.9839	1.27243	0.19057
4	9.80574	0.9616	1.10057	1.18106	19	9.87406	0.9818	1.27293	0.07996
h 5	+9.80640	−0.9628	+1.10846	−1.17437	h 20	+9.87565	−0.9799	+1.27330	−9.93129
(21.0) 6	9.80710	0.9628	1.11609	1.16745	(0.0) 21	9.87775	0.9785	1.27355	9.70273
7	9.80816	0.9618	1.12347	1.16030	22	9.88018	0.9779	1.27367	−9.18934
8	9.80986	0.9602	1.13061	1.15289	23	9.88272	0.9782	1.27366	+9.29076
9	9.81224	0.9586	1.13751	1.14524	24	9.88508	0.9796	1.27352	9.73677
10	+9.81519	−0.9576	+1.14419	−1.13732	25	+9.88698	−0.9817	+1.27326	+9.95215
11	9.81846	0.9575	1.15065	1.12912	26	9.88827	0.9841	1.27287	0.09546
12	9.82170	0.9584	1.15690	1.12065	27	9.88896	0.9859	1.27235	0.20299
13	9.82463	0.9604	1.16294	1.11188	28	9.88922	0.9870	1.27171	0.28906
14	9.82708	0.9630	1.16877	1.10279	29	9.88930	0.9868	1.27093	0.36079
15	+9.82896	−0.9658	+1.17442	−1.09339	30	+9.88953	−0.9854	+1.27002	+0.42225
16	+9.83026	−0.9686	+1.17987	−1.08365	Oct. 1	+9.89022	−0.9831	+1.26899	+0.47601

$E = 0''.00 = 0^{s}.000$

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.	Solar Day. (Sid. Hr.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.
Oct. 1	+9.89022	−0.9831	+1.26899	+0.47601	Nov. 16	+9.95620	−0.9404	+1.04012	+1.22053
2	9.89151	0.9804	1.26782	0.52374	17	9.95885	0.9403	1.02930	1.22593
3	9.89337	0.9779	1.26652	0.56665	18	9.96125	0.9413	1.01805	1.23113
4	9.89565	0.9760	1.26508	0.60559	h 19	9.96319	0.9429	1.00636	1.23614
h 5	9.89814	0.9751	1.26351	0.64123	(4.0) 20	9.96464	0.9445	0.99420	1.24096
(1.0) 6	+9.90047	−0.9752	+1.26181	+0.67407	21	+9.96561	−0.9456	+0.98155	+1.24560
7	9.90251	0.9761	1.25996	0.70448	22	9.96627	0.9456	0.96837	1.25006
8	9.90413	0.9775	1.25798	0.73280	23	9.96692	0.9442	0.95463	1.25434
9	9.90522	0.9790	1.25586	0.75928	24	9.96780	0.9418	0.94030	1.25844
10	9.90590	0.9803	1.25360	0.78412	25	9.96915	0.9384	0.92534	1.26238
11	+9.90624	−0.9810	+1.25120	+0.80751	26	+9.97103	−0.9349	+0.90968	+1.26614
12	9.90637	0.9810	1.24865	0.82960	27	9.97340	0.9318	0.89330	1.26974
13	9.90650	0.9802	1.24595	0.85050	28	9.97608	0.9297	0.87613	1.27318
14	9.90676	0.9787	1.24310	0.87032	29	9.97884	0.9287	0.85811	1.27646
15	9.90730	0.9764	1.24010	0.88917	30	9.98147	0.9290	0.83916	1.27958
16	+9.90828	−0.9737	+1.23695	+0.90712	Dec. 1	+9.98379	−0.9301	+0.81919	+1.28254
17	9.90976	0.9710	1.23364	0.92424	2	9.98566	0.9316	0.79811	1.28535
18	9.91173	0.9686	1.23018	0.94060	3	9.98709	0.9331	0.77581	1.28800
19	9.91405	0.9669	1.22655	0.95625	4	9.98819	0.9343	0.75216	1.29050
h 20	9.91654	0.9662	1.22276	0.97123	h 5	9.98906	0.9348	0.72698	1.29286
(2.0) 21	+9.91896	−0.9667	+1.21879	+0.98560	(5.0) 6	+9.98982	−0.9344	+0.70011	+1.29506
22	9.92103	0.9678	1.21466	0.99939	7	9.99061	0.9332	0.67133	1.29712
23	9.92258	0.9696	1.21035	1.01263	8	9.99157	0.9313	0.64033	1.29904
24	9.92358	0.9710	1.20587	1.02537	9	9.99283	0.9288	0.60680	1.30081
25	9.92412	0.9716	1.20120	1.03762	10	9.99444	0.9260	0.57030	1.30244
26	+9.92443	−0.9712	+1.19634	+1.04941	11	+9.99646	−0.9234	+0.53030	+1.30392
27	9.92482	0.9696	1.19129	1.06077	12	9.99884	0.9214	0.48608	1.30526
28	9.92556	0.9668	1.18605	1.07172	13	0.00145	0.9204	0.43668	1.30647
29	9.92684	0.9636	1.18060	1.08228	14	0.00415	0.9206	0.38075	1.30753
30	9.92871	0.9601	1.17495	1.09246	15	0.00664	0.9219	0.31637	1.30846
31	+9.93105	−0.9573	+1.16909	+1.10228	16	+0.00877	−0.9240	+0.24058	+1.30925
Nov. 1	9.93366	0.9554	1.16301	1.11176	17	0.01046	0.9267	0.14852	1.30989
2	9.93627	0.9546	1.15671	1.12091	18	0.01167	0.9288	0.03132	1.31041
3	9.93863	0.9549	1.15017	1.12975	19	0.01252	0.9299	9.87007	1.31078
h 4	9.94061	0.9558	1.14340	1.13828	h 20	0.01326	0.9297	9.61041	1.31102
(3.0) 5	+9.94212	−0.9569	+1.13638	+1.14652	(6.0) 21	+0.01410	−0.9284	+8.86865	+1.31112
6	9.94320	0.9579	1.12911	1.15448	22	0.01529	0.9259	−9.41506	1.31108
7	9.94394	0.9584	1.12158	1.16217	23	0.01695	0.9231	9.77377	1.31090
8	9.94447	0.9583	1.11377	1.16960	24	0.01906	0.9206	9.96744	1.31059
9	9.94495	0.9574	1.10569	1.17678	25	0.02151	0.9189	0.10083	1.31014
10	+9.94551	−0.9555	+1.09730	+1.18371	26	+0.02412	−0.9184	−0.20263	+1.30955
11	9.94632	0.9530	1.08862	1.19040	27	0.02664	0.9192	0.28493	1.30882
12	9.94748	0.9500	1.07961	1.19686	28	0.02891	0.9210	0.35398	1.30795
13	9.94907	0.9469	1.07028	1.20310	29	0.03081	0.9235	0.41342	1.30694
14	9.95113	0.9439	1.06059	1.20912	30	0.03230	0.9260	0.46558	1.30580
15	+9.95356	−0.9417	+1.05055	+1.21493	31	+0.03344	−0.9282	−0.51201	+1.30451
16	+9.95620	−0.9404	+1.04012	+1.22053	32	+0.03433	−0.9299	−0.55383	+1.30308

E = 0″.00 = 0ˢ.000

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f	f′	G		H		Log g.	Log h.	i	Log i.
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	° ′	h m	° ′	h m			″	
Jan. 0	0.0007	−0.108	−0.008	264 58.0	17 39.9	350 36.9	23 22.5	0.93561	1.31003	−1.44	−0.1596
1	0.0034	0.096	0.011	265 20.5	17 41.4	349 40.5	23 18.7	0.93350	1.30981	1.59	0.2005
2	0.0062	0.085	0.010	265 51.2	17 43.4	348 44.0	23 14.9	0.93112	1.30956	1.73	0.2377
3	0.0089	0.073	0.007	266 29.4	17 46.0	347 47.5	23 11.2	0.92910	1.30930	1.87	0.2718
4	0.0116	0.061	−0.002	267 13.6	17 48.9	346 50.8	23 7.4	0.92790	1.30901	2.01	0.3034
h (7.0) 5	0.0144	−0.048	+0.003	268 0.3	17 52.0	345 54.1	23 3.6	0.92778	1.30871	−2.15	−0.3326
6	0.0171	0.036	0.008	268 45.8	17 55.1	344 57.3	22 59.8	0.92880	1.30838	2.29	0.3599
7	0.0199	0.024	0.012	269 27.2	17 57.8	344 0.4	22 56.0	0.93071	1.30804	2.43	0.3855
8	0.0226	0.013	0.014	270 2.5	18 0.2	343 3.4	22 52.2	0.93323	1.30768	2.57	0.4095
9	0.0253	−0.001	0.013	270 31.2	18 2.0	342 6.4	22 48.4	0.93603	1.30730	2.70	0.4321
10	0.0281	+0.010	+0.010	270 52.9	18 3.5	341 9.2	22 44.6	0.93872	1.30690	−2.84	−0.4534
11	0.0308	0.022	+0.005	271 9.5	18 4.6	340 12.0	22 40.8	0.94095	1.30648	2.98	0.4736
12	0.0335	0.033	−0.001	271 22.3	18 5.5	339 14.6	22 37.0	0.94249	1.30605	3.11	0.4928
13	0.0363	0.045	0.008	271 34.1	18 6.3	338 17.1	22 33.1	0.94316	1.30560	3.24	0.5110
14	0.0390	0.056	0.014	271 47.8	18 7.2	337 19.6	22 29.3	0.94292	1.30513	3.38	0.5284
15	0.0418	+0.067	−0.018	272 6.1	18 8.4	336 21.9	22 25.5	0.94195	1.30465	−3.51	−0.5450
16	0.0445	0.079	0.020	272 31.8	18 10.1	335 24.1	22 21.6	0.94054	1.30415	3.64	0.5608
17	0.0472	0.090	0.018	273 6.3	18 12.4	334 26.1	22 17.7	0.93921	1.30364	3.77	0.5759
18	0.0500	0.100	0.012	273 48.7	18 15.3	333 28.1	22 13.9	0.93854	1.30311	3.89	0.5904
19	0.0527	0.112	−0.005	274 36.1	18 18.4	332 29.9	22 10.0	0.93902	1.30258	4.02	0.6043
h (8.0) 20	0.0554	+0.123	+0.003	275 24.1	18 21.6	331 31.6	22 6.1	0.94085	1.30202	−4.15	−0.6176
21	0.0582	0.134	0.010	276 7.5	18 24.5	330 33.1	22 2.2	0.94390	1.30146	4.27	0.6304
22	0.0609	0.144	0.015	276 42.3	18 26.8	329 34.5	21 58.3	0.94776	1.30088	4.39	0.6427
23	0.0637	0.155	0.015	277 7.2	18 28.5	328 35.8	21 54.4	0.95178	1.30030	4.51	0.6545
24	0.0664	0.165	0.013	277 23.0	18 29.5	327 36.9	21 50.5	0.95530	1.29970	4.63	0.6658
25	0.0691	+0.176	+0.007	277 32.8	18 30.2	326 37.9	21 46.5	0.95768	1.29910	−4.75	−0.6768
26	0.0719	0.186	0.000	277 40.8	18 30.7	325 38.7	21 42.6	0.95878	1.29848	4.87	0.6873
27	0.0746	0.196	−0.005	277 51.5	18 31.4	324 39.3	21 38.6	0.95877	1.29786	4.98	0.6974
28	0.0774	0.206	0.009	278 8.5	18 32.6	323 39.8	21 34.6	0.95798	1.29723	5.10	0.7072
29	0.0801	0.216	0.010	278 32.7	18 34.2	322 40.1	21 30.7	0.95696	1.29659	5.21	0.7166
30	0.0828	+0.226	−0.008	279 3.7	18 36.3	321 40.3	21 26.7	0.95627	1.29594	−5.32	−0.7257
31	0.0856	0.236	−0.003	279 39.5	18 38.6	320 40.3	21 22.7	0.95636	1.29530	5.43	0.7345
Feb. 1	0.0883	0.246	+0.002	280 16.5	18 41.1	319 40.1	21 18.7	0.95748	1.29464	5.53	0.7430
2	0.0910	0.255	0.008	280 51.3	18 43.4	318 39.7	21 14.6	0.95961	1.29398	5.64	0.7511
3	0.0938	0.265	0.012	281 21.5	18 45.4	317 39.2	21 10.6	0.96249	1.29333	5.74	0.7590
h (9.0) 4	0.0965	+0.275	+0.014	281 45.2	18 47.0	316 38.5	21 6.6	0.96580	1.29266	−5.84	−0.7666
5	0.0992	0.284	0.014	282 2.5	18 48.2	315 37.7	21 2.5	0.96920	1.29200	5.94	0.7740
6	0.1020	0.293	0.012	282 13.7	18 48.9	314 36.7	20 58.4	0.97242	1.29134	6.04	0.7810
7	0.1047	0.302	0.007	282 20.3	18 49.4	313 35.5	20 54.4	0.97518	1.29068	6.14	0.7878
8	0.1075	0.311	+0.001	282 24.0	18 49.6	312 34.2	20 50.3	0.97719	1.29002	6.23	0.7944
9	0.1102	+0.320	−0.005	282 27.3	18 49.8	311 32.7	20 46.2	0.97830	1.28936	−6.32	−0.8008
10	0.1129	0.329	0.012	282 32.6	18 50.2	310 31.0	20 42.1	0.97861	1.28870	6.41	0.8069
11	0.1157	0.338	0.017	282 42.2	18 50.8	309 29.2	20 38.0	0.97826	1.28805	6.50	0.8128
12	0.1184	0.346	0.019	282 58.3	18 51.9	308 27.2	20 33.8	0.97751	1.28740	6.58	0.8185
13	0.1212	0.355	0.019	283 22.0	18 53.5	307 25.1	20 29.7	0.97681	1.28676	6.67	0.8240
14	0.1239	+0.364	−0.015	283 52.9	18 55.5	306 22.8	20 25.5	0.97670	1.28613	−6.75	−0.8292
15	0.1266	+0.372	−0.008	284 27.7	18 57.9	305 20.4	20 21.4	0.97756	1.28550	−6.83	−0.8343

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f	f′	G		H		Log g.	Log h.	i	Log i.
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	° ′	h m	° ′	h m			″	
Feb. 15	0.1266	+0.372	−0.008	284 27.7	18 57.9	305 20.4	20 21.4	0.97756	1.28550	−6.83	−0.8343
16	0.1294	0.380	0.000	285 2.8	19 0.2	304 17.8	20 17.2	0.97961	1.28488	6.91	0.8392
17	0.1321	0.388	+0.007	285 34.1	19 2.3	303 15.1	20 13.0	0.98272	1.28427	6.98	0.8439
h 18	0.1348	0.397	0.012	285 57.9	19 3.9	302 12.2	20 8.8	0.98652	1.28367	7.05	0.8484
(10.0) 19	0.1376	0.405	0.014	286 13.1	19 4.9	301 9.2	20 4.6	0.99041	1.28308	7.12	0.8527
20	0.1403	+0.412	+0.013	286 20.2	19 5.4	300 6.1	20 0.4	0.99377	1.28250	−7.19	−0.8569
21	0.1431	0.420	0.008	286 22.4	19 5.5	299 2.8	19 56.2	0.99616	1.28194	7.26	0.8608
22	0.1458	0.428	+0.002	286 23.3	19 5.5	297 59.4	19 52.0	0.99738	1.28139	7.32	0.8646
23	0.1485	0.435	−0.004	286 26.8	19 5.8	296 55.8	19 47.7	0.99752	1.28085	7.38	0.8683
24	0.1513	0.443	0.008	286 36.2	19 6.4	295 52.1	19 43.5	0.99685	1.28032	7.44	0.8718
25	0.1540	+0.451	−0.010	286 52.7	19 7.5	294 48.3	19 39.2	0.99593	1.27982	−7.50	−0.8751
26	0.1568	0.458	0.009	287 15.9	19 9.1	293 44.4	19 35.0	0.99525	1.27932	7.56	0.8782
27	0.1595	0.465	−0.004	287 43.5	19 10.9	292 40.3	19 30.7	0.99512	1.27885	7.61	0.8812
28	0.1622	0.473	+0.001	288 12.3	19 12.8	291 36.2	19 26.4	0.99588	1.27839	7.66	0.8840
Mar. 1	0.1650	0.480	0.007	288 39.0	19 14.6	290 31.9	19 22.1	0.99762	1.27795	7.70	0.8867
2	0.1677	+0.488	+0.012	289 1.2	19 16.1	289 27.5	19 17.8	1.00006	1.27753	−7.75	−0.8893
3	0.1704	0.495	0.015	289 17.7	19 17.2	288 23.1	19 13.5	1.00285	1.27713	7.79	0.8916
4	0.1732	0.503	0.015	289 27.9	19 17.9	287 18.5	19 9.2	1.00568	1.27674	7.83	0.8939
5	0.1759	0.510	0.014	289 33.0	19 18.2	286 13.9	19 4.9	1.00828	1.27638	7.87	0.8960
h 6	0.1786	0.516	0.010	289 34.2	19 18.3	285 9.2	19 0.6	1.01039	1.27604	7.90	0.8979
(11.0) 7	0.1814	+0.523	+0.004	289 33.3	19 18.2	284 4.4	18 56.3	1.01183	1.27572	−7.94	−0.8998
8	0.1841	0.530	−0.003	289 32.3	19 18.2	282 59.6	18 52.0	1.01252	1.27542	7.97	0.9014
9	0.1869	0.537	0.009	289 33.2	19 18.2	281 54.7	18 47.6	1.01247	1.27515	8.00	0.9030
10	0.1896	0.544	0.015	289 38.2	19 18.5	280 49.8	18 43.3	1.01178	1.27490	8.02	0.9044
11	0.1923	0.550	0.018	289 49.3	19 19.3	279 44.9	18 39.0	1.01070	1.27466	8.05	0.9056
12	0.1951	+0.557	−0.019	290 7.2	19 20.5	278 39.9	18 34.7	1.00961	1.27446	−8.07	−0.9068
13	0.1978	0.564	0.016	290 31.6	19 22.1	277 34.9	18 30.3	1.00896	1.27428	8.09	0.9077
14	0.2006	0.571	0.010	291 0.1	19 24.0	276 29.9	18 26.0	1.00917	1.27412	8.10	0.9086
15	0.2033	0.578	−0.003	291 29.0	19 25.9	275 24.9	18 21.7	1.01043	1.27398	8.12	0.9093
16	0.2060	0.585	+0.004	291 55.1	19 27.7	274 19.9	18 17.3	1.01265	1.27388	8.13	0.9099
17	0.2088	+0.592	+0.010	292 15.1	19 29.0	273 14.9	18 13.0	1.01555	1.27379	−8.14	−0.9104
18	0.2115	0.599	0.013	292 27.7	19 29.9	272 10.0	18 8.7	1.01865	1.27373	8.14	0.9107
19	0.2142	0.605	0.013	292 33.0	19 30.2	271 5.0	18 4.3	1.02135	1.27369	8.14	0.9109
20	0.2170	0.612	0.009	292 33.4	19 30.2	270 0.0	18 0.0	1.02325	1.27368	8.15	0.9110
h 21	0.2197	0.618	+0.003	292 32.6	19 30.2	268 55.2	17 55.7	1.02412	1.27369	8.14	0.9109
(12.0) 22	0.2225	+0.625	−0.003	292 34.7	19 30.3	267 50.4	17 51.4	1.02390	1 27373	−8.14	−0.9107
23	0.2252	0.632	0.008	292 42.5	19 30.8	266 45.6	17 47.0	1.02282	1.27379	8.14	0.9104
24	0.2279	0.639	0.011	292 57.2	19 31.8	265 40.9	17 42.7	1.02142	1.27387	8.13	0.9099
25	0.2307	0.646	0.010	293 18.7	19 33.2	264 36.2	17 38.4	1.02017	1.27398	8.12	0.9093
26	0.2334	0.652	0.006	293 45.3	19 35.0	263 31.6	17 34.1	1.01948	1.27412	8.10	0.9086
27	0.2362	+0.659	−0.001	294 13.7	19 36.9	262 27.1	17 29.8	1.01967	1.27427	−8.09	−0.9078
28	0.2389	0.666	+0.005	294 40.6	19 38.7	261 22.7	17 25.5	1.02067	1.27445	8.07	0.9068
29	0.2416	0.673	0.011	295 3.1	19 40.2	260 18.4	17 21.2	1.02236	1.27466	8.05	0.9057
30	0.2444	0.680	0.014	295 19.9	19 41.3	259 14.1	17 16.9	1.02450	1.27488	8.02	0.9044
31	0.2471	0.686	0.016	295 31.0	19 42.1	258 10.0	17 12.7	1.02674	1.27513	8.00	0.9031
Apr. 1	0.2498	+0.693	+0.015	295 37.3	19 42.5	257 5.9	17 8.4	1.02872	1.27540	−7.97	−0.9016
2	0.2526	+0.701	+0.011	295 39.9	19 42.7	256 2.0	17 4.1	1.03024	1.27569	−7.94	−0.8999

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	*f*	*f′*	*G*		*H*		Log *g*.	Log *h*.	*i*	Log *i*.
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	° ′	h m	° ′	h m			″	
Apr. 1	0.2498	+0.693	+0.015	295 37.3	19 42.5	257 5.9	17 8.4	1.02872	1.27540	−7.97	−0.9016
2	0.2526	0.701	0.011	295 39.9	19 42.7	256 2.0	17 4.1	1.03024	1.27569	7.94	0.8999
3	0.2553	0.708	+0.006	295 40.5	19 42.7	254 58.2	16 59.9	1.03113	1.27600	7.91	0.8982
4	0.2580	0.715	0.000	295 41.0	19 42.7	253 54.6	16 55.6	1.03134	1.27634	7.88	0.8963
5	0.2608	0.722	−0.007	295 43.8	19 42.9	252 51.0	16 51.4	1.03089	1.27669	7.84	0.8942
h (18.0) 6	0.2635	+0.729	−0.013	295 51.0	19 43.4	251 47.6	16 47.2	1.02986	1.27706	−7.80	−0.8920
7	0.2663	0.736	0.017	296 3.6	19 44.2	250 44.4	16 43.0	1.02845	1.27745	7.76	0.8897
8	0.2690	0.743	0.018	296 22.9	19 45.5	249 41.3	16 38.8	1.02702	1.27786	7.71	0.8873
9	0.2717	0.750	0.016	296 48.1	19 47.2	248 38.4	16 34.6	1.02602	1.27829	7.67	0.8847
10	0.2745	0.757	0.012	297 17.7	19 49.2	247 35.6	16 30.4	1.02580	1.27873	7.62	0.8819
11	0.2772	+0.765	−0.005	297 48.3	19 51.2	246 33.0	16 26.2	1.02653	1.27919	−7.57	−0.8790
12	0.2800	0.772	+0.003	298 16.7	19 53.1	245 30.6	16 22.0	1.02822	1.27967	7.52	0.8760
13	0.2827	0.780	0.009	298 39.2	19 54.6	244 28.4	16 17.9	1.03063	1.28016	7.46	0.8728
14	0.2854	0.788	0.012	298 53.9	19 55.6	243 26.3	16 13.8	1.03333	1.28067	7.40	0.8695
15	0.2882	0.795	0.013	299 2.3	19 56.2	242 24.4	16 9.6	1.03579	1.28118	7.34	0.8660
16	0.2909	+0.803	+0.010	299 5.9	19 56.4	241 22.8	16 5.5	1.03747	1.28172	−7.28	−0.8624
17	0.2936	0.811	+0.004	299 7.5	19 56.5	240 21.3	16 1.4	1.03812	1.28226	7.22	0.8586
18	0.2964	0.819	−0.003	299 12.0	19 56.8	239 20.0	15 57.3	1.03779	1.28281	7.16	0.8547
19	0.2991	0.827	0.008	299 22.7	19 57.5	238 18.9	15 53.3	1.03667	1.28338	7.09	0.8506
20	0.3019	0.835	0.011	299 40.4	19 58.7	237 18.0	15 49.2	1.03525	1.28395	7.02	0.8463
h (14.0) 21	0.3046	+0.844	−0.012	300 5.5	20 0.4	236 17.3	15 45.2	1.03396	1.28454	−6.95	−0.8418
22	0.3073	0.852	0.009	300 36.1	20 2.4	235 16.8	15 41.1	1.03320	1.28513	6.88	0.8372
23	0.3101	0.859	−0.003	301 8.1	20 4.5	234 16.4	15 37.1	1.03329	1.28573	6.80	0.8325
24	0.3128	0.867	+0.003	301 38.8	20 6.6	233 16.3	15 33.1	1.03427	1.28634	6.72	0.8275
25	0.3156	0.875	0.009	302 6.0	20 8.4	232 16.4	15 29.1	1.03593	1.28695	6.64	0.8224
26	0.3183	+0.884	+0.014	302 27.3	20 9.8	231 16.6	15 25.1	1.03801	1.28757	−6.56	−0.8170
27	0.3210	0.893	0.016	302 42.7	20 10.8	230 17.1	15 21.1	1.04020	1.28819	6.48	0.8115
28	0.3238	0.901	0.016	302 52.8	20 11.5	229 17.8	15 17.1	1.04220	1.28882	6.40	0.8058
29	0.3265	0.910	0.013	302 58.9	20 11.9	228 18.6	15 13.2	1.04382	1.28945	6.31	0.7999
30	0.3292	0.919	0.008	303 3.6	20 12.2	227 19.7	15 9.3	1.04486	1.29008	6.22	0.7938
May 1	0.3320	+0.928	+0.002	303 8.5	20 12.6	226 20.9	15 5.4	1.04522	1.29072	−6.13	−0.7875
2	0.3347	0.938	−0.005	303 15.7	20 13.0	225 22.4	15 1.5	1.04497	1.29135	6.04	0.7809
3	0.3374	0.947	0.011	303 26.9	20 13.8	224 24.0	14 57.6	1.04421	1.29198	5.94	0.7742
4	0.3402	0.955	0.015	303 43.5	20 14.9	223 25.9	14 53.7	1.04316	1.29262	5.85	0.7672
5	0.3429	0.964	0.017	304 6.3	20 16.4	222 27.9	14 49.9	1.04214	1.29325	5.75	0.7599
h 6	0.3457	+0.974	−0.016	304 35.1	20 18.3	221 30.1	14 46.0	1.04153	1.29388	−5.66	−0.7524
(15.0) 7	0.3484	0.983	0.013	305 7.7	20 20.5	220 32.6	14 42.2	1.04161	1.29450	5.56	0.7447
8	0.3511	0.992	−0.006	305 41.3	20 22.7	219 35.2	14 38.4	1.04265	1.29513	5.45	0.7367
9	0.3539	1.002	+0.001	306 12.5	20 24.8	218 38.0	14 34.5	1.04463	1.29575	5.35	0.7284
10	0.3566	1.012	0.008	306 37.9	20 26.5	217 41.0	14 30.7	1.04734	1.29636	5.25	0.7199
11	0.3594	+1.022	+0.012	306 56.1	20 27.7	216 44.2	14 26.9	1.05036	1.29697	−5.14	−0.7110
12	0.3621	1.032	0.014	307 7.1	20 28.5	215 47.6	14 23.2	1.05315	1.29757	5.03	0.7019
13	0.3648	1.042	0.011	307 13.3	20 28.9	214 51.2	14 19.4	1.05528	1.29817	4.92	0.6924
14	0.3676	1.052	+0.006	307 17.6	20 29.2	213 54.9	14 15.7	1.05655	1.29876	4.82	0.6826
15	0.3703	1.062	−0.001	307 24.3	20 29.6	212 58.8	14 11.9	1.05682	1.29934	4.70	0.6725
16	0.3730	+1.072	−0.007	307 36.2	20 30.4	212 2.9	14 8.2	1.05640	1.29991	−4.59	−0.6620
17	0.3758	+1.082	−0.011	307 55.5	20 31.7	211 7.2	14 4.5	1.05562	1.30047	−4.48	−0.6511

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f	f′	G		H		Log g.	Log h.	i	Log i.
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	° ′	h m	° ′	h m			″	
May 17	0.3758	+1.082	−0.011	307 55.5	20 31.7	211 7.2	14 4.5	1.05562	1.30047	−4.48	−0.6511
18	0.3785	1.092	0.013	308 21.9	20 33.5	210 11.7	14 0.8	1.05503	1.30102	4.36	0.6398
19	0.3813	1.103	0.011	308 53.5	20 35.6	209 16.3	13 57.1	1.05499	1.30156	4.25	0.6281
20	0.3840	1.113	−0.006	309 27.1	20 37.8	208 21.0	13 53.4	1.05576	1.30209	4.13	0.6159
21	0.3867	1.124	0.000	309 59.3	20 39.9	207 26.0	13 49.7	1.05736	1.30261	4.01	0.6033
h (16.0) 22	0.3895	+1.134	+0.007	310 27.5	20 41.8	206 31.0	13 46.1	1.05964	1.30312	−3.89	−0.5902
23	0.3922	1.145	0.012	310 49.9	20 43.3	205 36.3	13 42.4	1.06236	1.30362	3.77	0.5765
24	0.3950	1.156	0.015	311 6.3	20 44.4	204 41.6	13 38.8	1.06522	1.30410	3.65	0.5623
25	0.3977	1.166	0.016	311 17.5	20 45.2	203 47.1	13 35.1	1.06784	1.30457	3.53	0.5475
26	0.4004	1.177	0.014	311 24.8	20 45.7	202 52.7	13 31.5	1.07004	1.30503	3.40	0.5320
27	0.4032	+1.188	+0.010	311 30.4	20 46.0	201 58.4	13 27.9	1.07170	1.30547	−3.28	−0.5158
28	0.4059	1.199	+0.004	311 36.0	20 46.4	201 4.3	13 24.3	1.07277	1.30590	3.15	0.4989
29	0.4086	1.210	−0.003	311 43.5	20 46.9	200 10.3	13 20.7	1.07327	1.30631	3.03	0.4812
30	0.4114	1.221	0.009	311 55.0	20 47.7	199 16.4	13 17.1	1.07338	1.30671	2.90	0.4626
31	0.4141	1.232	0.014	312 11.6	20 48.8	198 22.6	13 13.5	1.07325	1.30710	2.77	0.4430
June 1	0.4168	+1.244	−0.017	312 33.8	20 50.3	197 28.9	13 9.9	1.07313	1.30746	−2.64	−0.4224
2	0.4196	1.255	0.017	313 0.7	20 52.0	196 35.4	13 6.4	1.07342	1.30781	2.52	0.4007
3	0.4223	1.267	0.014	313 30.9	20 54.1	195 41.9	13 2.8	1.07440	1.30815	2.39	0.3777
4	0.4251	1.278	0.008	314 2.2	20 56.1	194 48.5	12 59.2	1.07616	1.30846	2.26	0.3533
5	0.4278	1.289	−0.001	314 30.9	20 58.1	193 55.2	12 55.7	1.07884	1.30877	2.12	0.3273
h (17.0) 6	0.4305	+1.300	+0.007	314 54.1	20 59.6	193 1.9	12 52.1	1.08219	1.30905	−1.99	−0.2995
7	0.4333	1.312	0.012	315 10.1	21 0.7	192 8.8	12 48.6	1.08578	1.30932	1.86	0.2697
8	0.4360	1.323	0.015	315 19.5	21 1.3	191 15.8	12 45.1	1.08920	1.30956	1.73	0.2376
9	0.4388	1.335	0.014	315 24.0	21 1.6	190 22.8	12 41.5	1.09204	1.30980	1.60	0.2028
10	0.4415	1.347	0.009	315 26.5	21 1.8	189 29.9	12 38.0	1.09400	1.31001	1.46	0.1648
11	0.4442	+1.359	+0.002	315 30.4	21 2.0	188 37.0	12 34.5	1.09515	1.31020	−1.33	−0.1231
12	0.4470	1.370	−0.004	315 39.1	21 2.6	187 44.2	12 30.9	1.09563	1.31038	1.19	0.0768
13	0.4497	1.382	0.010	315 54.1	21 3.6	186 51.5	12 27.4	1.09573	1.31054	1.06	0.0249
14	0.4524	1.394	0.013	316 15.2	21 5.0	185 58.9	12 23.9	1.09594	1.31067	0.92	9.9658
15	0.4552	1.406	0.012	316 41.8	21 6.8	185 6.2	12 20.4	1.09664	1.31080	0.79	9.8972
16	0.4579	+1.418	−0.008	317 10.5	21 8.7	184 13.6	12 16.9	1.09808	1.31090	−0.65	−9.8157
17	0.4607	1.429	−0.002	317 38.0	21 10.5	183 21.1	12 13.4	1.10033	1.31098	0.52	9.7150
18	0.4634	1.441	+0.004	318 1.1	21 12.1	182 28.5	12 9.9	1.10319	1.31104	0.38	9.5837
19	0.4661	1.452	0.010	318 18.6	21 13.2	181 36.0	12 6.4	1.10643	1.31109	0.25	9.3943
20	0.4689	1.464	0.014	318 30.3	21 14.0	180 43.5	12 2.9	1.10973	1.31111	−0.11	−9.0505
h (18.0) 21	0.4716	+1.476	+0.016	318 37.7	21 14.5	179 51.0	11 59.4	1.11282	1.31112	+0.02	+8.3665
22	0.4744	1.488	0.014	318 41.3	21 14.8	178 58.5	11 55.9	1.11545	1.31110	0.16	9.2009
23	0.4771	1.499	0.011	318 42.9	21 14.9	178 6.0	11 52.4	1.11760	1.31107	0.29	9.4689
24	0.4798	1.511	+0.005	318 44.4	21 15.0	177 13.5	11 48.9	1.11922	1.31102	0.43	9.6333
25	0.4826	1.523	−0.001	318 48.0	21 15.2	176 21.0	11 45.4	1.12034	1.31095	0.56	9.7522
26	0.4853	+1.535	−0.008	318 54.5	21 15.6	175 28.4	11 41.9	1.12108	1.31086	+0.70	+9.8453
27	0.4880	1.546	0.013	319 5.5	21 16.4	174 35.9	11 38.4	1.12157	1.31076	0.84	9.9218
28	0.4908	1.557	0.017	319 21.2	21 17.4	173 43.3	11 34.9	1.12212	1.31063	0.97	9.9868
29	0.4935	1.569	0.018	319 40.8	21 18.7	172 50.7	11 31.4	1.12300	1.31048	1.10	0.0432
30	0.4962	1.581	0.016	320 3.6	21 20.2	171 58.0	11 27.9	1.12440	1.31034	1.24	0.0930
July 1	0.4990	+1.593	−0.011	320 27.4	21 21.8	171 5.3	11 24.4	1.12648	1.31014	+1.37	+0.1375
2	0.5017	+1.605	−0.004	320 49.0	21 23.3	170 12.5	11 20.8	1.12935	1.30994	+1.51	+0.1778

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f	f′	G		H		Log g.	Log h.	i	Log i.
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	° ′	h m	° ′	h m			″	
July 1	0.4990	+1.593	−0.011	320 27.4	21 21.8	171 5.3	11 24.4	1.12648	1.31014	+1.37	+0.1375
2	0.5017	1.605	−0.004	320 49.0	21 23.3	170 12.5	11 20.8	1.12935	1.30994	1.51	0.1778
3	0.5045	1.616	+0.004	321 6.0	21 24.4	169 19.7	11 17.3	1.13281	1.30972	1.64	0.2146
4	0.5072	1.627	0.010	321 17.0	21 25.1	168 26.8	11 13.8	1.13651	1.30949	1.77	0.2484
h 5	0.5099	1.638	0.014	321 21.6	21 25.4	167 33.9	11 10.3	1.14008	1.30923	1.90	0.2796
(19.0) 6	0.5127	+1.650	+0.015	321 21.7	21 25.4	166 40.9	11 6.7	1.14320	1.30896	+2.04	+0.3086
7	0.5154	1.662	0.011	321 19.2	21 25.3	165 47.9	11 3.2	1.14555	1.30867	2.17	0.3357
8	0.5182	1.673	+0.006	321 18.0	21 25.2	164 54.8	10 59.6	1.14710	1.30837	2.30	0.3611
9	0.5209	1.684	−0.001	321 20.5	21 25.4	164 1.6	10 56.1	1.14798	1.30804	2.43	0.3850
10	0.5236	1.695	0.007	321 28.8	21 25.9	163 8.3	10 52.6	1.14851	1.30771	2.56	0.4075
11	0.5264	+1.707	−0.011	321 42.3	21 26.8	162 14.9	10 49.0	1.14907	1.30735	+2.68	+0.4288
12	0.5291	1.719	0.012	322 0.8	21 28.1	161 21.5	10 45.4	1.15001	1.30698	2.81	0.4490
13	0.5318	1.730	0.009	322 21.5	21 29.4	160 27.9	10 41.9	1.15153	1.30660	2.94	0.4681
14	0.5346	1.741	−0.004	322 41.2	21 30.7	159 34.3	10 38.3	1.15368	1.30620	3.06	0.4864
15	0.5373	1.751	+0.003	322 57.5	21 31.8	158 40.5	10 34.7	1.15642	1.30578	3.19	0.5037
16	0.5401	+1.762	+0.009	323 9.0	21 32.6	157 46.7	10 31.1	1.15952	1.30535	+3.31	+0.5204
17	0.5428	1.773	0.013	323 15.7	21 33.0	156 52.7	10 27.5	1.16265	1.30491	3.44	0.5362
18	0.5455	1.784	0.016	323 17.7	21 33.2	155 58.6	10 23.9	1.16558	1.30445	3.56	0.5514
19	0.5483	1.795	0.015	323 16.5	21 33.1	155 4.4	10 20.3	1.16819	1.30398	3.68	0.5660
20	0.5510	1.805	0.012	323 13.4	21 32.9	154 10.1	10 16.7	1.17033	1.30350	3.80	0.5800
h 21	0.5537	+1.816	+0.007	323 10.3	21 32.7	153 15.6	10 13.0	1.17195	1.30300	+3.92	+0.5934
(20.0) 22	0.5565	1.826	+0.001	323 8.7	21 32.6	152 21.0	10 9.4	1.17314	1.30249	4.04	0.6064
23	0.5592	1.837	−0.006	323 9.8	21 32.7	151 26.2	10 5.7	1.17396	1.30197	4.16	0.6188
24	0.5620	1.848	0.012	323 14.3	21 33.0	150 31.3	10 2.1	1.17452	1.30144	4.27	0.6308
25	0.5647	1.858	0.017	323 22.8	21 33.5	149 36.2	9 58.4	1.17510	1.30090	4.39	0.6423
26	0.5674	+1.869	−0.019	323 35.3	21 34.4	148 41.0	9 54.7	1.17588	1.30035	+4.50	+0.6534
27	0.5702	1.879	0.018	323 50.7	21 35.4	147 45.7	9 51.0	1.17704	1.29979	4.62	0.6642
28	0.5729	1.889	0.014	324 7.0	21 36.5	146 50.2	9 47.3	1.17880	1.29922	4.73	0.6745
29	0.5756	1.899	−0.007	324 22.0	21 37.5	145 54.5	9 43.6	1.18123	1.29864	4.84	0.6845
30	0.5784	1.909	0.000	324 33.6	21 38.3	144 58.6	9 39.9	1.18419	1.29806	4.94	0.6942
31	0.5811	+1.919	+0.007	324 40.3	21 38.7	144 2.6	9 36.2	1.18741	1.29747	+5.05	+0.7035
Aug. 1	0.5839	1.928	0.012	324 41.9	21 38.8	143 6.4	9 32.4	1.19061	1.29687	5.16	0.7125
2	0.5866	1.938	0.014	324 38.7	21 38.6	142 10.0	9 28.7	1.19347	1.29626	5.26	0.7213
3	0.5893	1.948	0.012	324 33.2	21 38.2	141 13.5	9 24.9	1.19571	1.29566	5.37	0.7297
4	0.5921	1.957	0.008	324 28.0	21 37.9	140 16.8	9 21.1	1.19725	1.29504	5.47	0.7378
h 5	0.5948	+1.966	+0.001	324 25.7	21 37.7	139 19.9	9 17.3	1.19813	1.29442	+5.57	+0.7457
(21.0) 6	0.5976	1.975	−0.005	324 28.4	21 37.9	138 22.8	9 13.5	1.19858	1.29380	5.67	0.7534
7	0.6003	1.985	0.010	324 36.0	21 38.4	137 25.6	9 9.7	1.19894	1.29318	5.76	0.7608
8	0.6030	1.994	0.011	324 48.3	21 39.2	136 28.2	9 5.9	1.19953	1.29255	5.86	0.7679
9	0.6058	2.003	0.009	325 3.2	21 40.2	135 30.6	9 2.0	1.20060	1.29193	5.95	0.7748
10	0.6085	+2.012	−0.005	325 18.1	21 41.2	134 32.8	8 58.2	1.20225	1.29130	+6.05	+0.7815
11	0.6112	2.021	+0.002	325 30.5	21 42.0	133 34.8	8 54.3	1.20442	1.29067	6.14	0.7879
12	0.6140	2.030	0.008	325 38.8	21 42.6	132 36.7	8 50.4	1.20695	1.29004	6.23	0.7942
13	0.6167	2.039	0.013	325 42.5	21 42.8	131 38.4	8 46.6	1.20959	1.28942	6.31	0.8002
14	0.6194	2.048	0.016	325 42.1	21 42.8	130 39.9	8 42.7	1.21209	1.28880	6.40	0.8060
15	0.6222	+2.057	+0.016	325 38.7	21 42.6	129 41.2	8 38.7	1.21425	1.28818	+6.48	+0.8117
16	0.6249	+2.065	+0.014	325 33.4	21 42.2	128 42.3	8 34.8	1.21602	1.28756	+6.56	+0.8171

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f	f′	G		H		Log g.	Log h.	i	Log i.
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	° ′	h m	° ′	h m			″	
Aug. 16	0.6249	+2.065	+0.014	325 33.4	21 42 2	128 42.3	8 34.8	1.21602	1.28756	+6.56	+0.8171
17	0.6277	2.074	0.009	325 27.8	21 41.8	127 43.2	8 30.9	1.21731	1.28695	6.64	0.8224
18	0.6304	2.082	+0.004	325 23.5	21 41.6	126 43.9	8 26.9	1.21816	1.28634	6.72	0.8275
19	0.6331	2.091	−0.004	325 21.5	21 41.4	125 44.5	8 23.0	1.21867	1.28574	6.80	0.8324
h 20	0.6359	2.099	0.010	325 22.7	21 41.5	124 44.8	8 19.0	1.21894	1.28515	6.87	0.8371
(22.0) 21	0.6386	+2.106	−0.015	325 27.6	21 41.9	123 44.9	8 15.0	1.21912	1.28456	+6.94	+0.8417
22	0.6414	2.114	0.018	325 35.8	21 42.4	122 44.9	8 11.0	1.21945	1.28398	7.02	0.8461
23	0.6441	2.122	0.018	325 46.6	21 43.1	121 44.7	8 7.0	1.22012	1.28341	7.08	0.8503
24	0.6468	2.130	0.016	325 59.3	21 44.0	120 44.3	8 3.0	1.22126	1.28285	7.15	0.8544
25	0.6496	2.138	0.010	326 11.7	21 44.8	119 43.7	7 58.9	1.22294	1.28230	7.22	0.8583
26	0.6523	+2.146	−0.003	326 21.5	21 45.4	118 42.9	7 54.8	1.22516	1.28177	+7.28	+0.8620
27	0.6550	2.154	+0.004	326 27.2	21 45.8	117 42.0	7 50.8	1.22769	1.28124	7.34	0.8656
28	0.6578	2.161	0.010	326 28.1	21 45.9	116 40.9	7 46.7	1.23028	1.28072	7.40	0.8691
29	0.6605	2.169	0.013	326 25.1	21 45.7	115 39.6	7 42.6	1.23261	1.28022	7.45	0.8724
30	0.6633	2.177	0.012	326 19.3	21 45.3	114 38.1	7 38.6	1.23449	1.27974	7.51	0.8756
31	0.6660	+2.185	+0.008	326 13.0	21 44.9	113 36.4	7 34.4	1.23575	1.27926	+7.56	+0.8786
Sept. 1	0.6687	2.192	+0.002	326 9.0	21 44.6	112 34.6	7 30.3	1.23640	1.27881	7.61	0.8815
2	0.6715	2.200	−0.004	326 9.3	21 44.6	111 32.6	7 26.2	1.23660	1.27836	7.66	0.8842
3	0.6742	2.207	0.009	326 14.8	21 45.0	110 30.5	7 22.0	1.23659	1.27794	7.70	0.8868
h 4	0.6770	2.214	0.011	326 24.7	21 45.6	109 28.3	7 17.9	1.23674	1.27753	7.75	0.8892
(23.0) 5	0.6797	+2.221	−0.010	326 37.7	21 46.5	108 25.9	7 13.7	1.23726	1.27714	+7.79	+0.8916
6	0.6824	2.227	−0.006	326 51.4	21 47.4	107 23.3	7 9.6	1.23830	1.27677	7.83	0.8937
7	0.6852	2.234	0.000	327 3.5	21 48.2	106 20.7	7 5.4	1.23986	1.27642	7.87	0.8958
8	0.6879	2.241	+0.007	327 12.4	21 48.8	105 17.9	7 1.2	1.24179	1.27608	7.90	0.8977
9	0.6906	2.249	0.012	327 17.0	21 49.1	104 14.9	6 57.0	1.24385	1.27577	7.93	0.8995
10	0.6934	+2.256	+0.016	327 17.5	21 49.2	103 11.9	6 52.8	1.24581	1.27548	+7.96	+0.9011
11	0.6961	2.263	0.017	327 14.8	21 49.0	102 8.8	6 48.6	1.24756	1.27520	7.99	0.9026
12	0.6988	2.270	0.015	327 10.4	21 48.7	101 5.5	6 44.4	1.24891	1.27495	8.02	0.9040
13	0.7016	2.277	0.011	327 5.6	21 48.4	100 2.2	6 40.1	1.24985	1.27472	8.04	0.9053
14	0.7043	2.283	+0.006	327 1.8	21 48.1	98 58.7	6 35.9	1.25038	1.27452	8.06	0.9064
15	0.7071	+2.290	−0.001	327 0.0	21 48.0	97 55.2	6 31.7	1.25057	1.27433	+8.08	+0.9074
16	0.7098	2.297	0.007	327 1.0	21 48.1	96 51.6	6 27.4	1.25055	1.27417	8.10	0.9083
17	0.7125	2.304	0.013	327 5.4	21 48.4	95 47.9	6 23.2	1.25042	1.27403	8.11	0.9091
18	0.7153	2.311	0.017	327 13.3	21 48.9	94 44.1	6 18.9	1.25034	1.27391	8.12	0.9097
19	0.7180	2.317	0.018	327 24.3	21 49.6	93 40.2	6 14.7	1.25050	1.27382	8.13	0.9102
h 20	0.7208	+2.323	−0.016	327 37.0	21 50.5	92 36.3	6 10.4	1.25108	1.27375	+8.14	+0.9106
(0.0) 21	0.7235	2.330	0.012	327 49.7	21 51.3	91 32.3	6 6.2	1.25217	1.27370	8.14	0.9108
22	0.7262	2.336	−0.005	328 0.6	21 52.0	90 28.3	6 1.9	1.25373	1.27368	8.15	0.9109
23	0.7290	2.343	+0.002	328 8.2	21 52.5	89 24.3	5 57.6	1.25568	1.27368	8.15	0.9109
24	0.7317	2.350	0.008	328 11.5	21 52.8	88 20.2	5 53.3	1.25776	1.27371	8.14	0.9108
25	0.7344	+2.357	+0.011	328 10.8	21 52.7	87 16.0	5 49.1	1.25971	1.27376	+8.14	+0.9105
26	0.7372	2.364	0.012	328 7.1	21 52.5	86 11.9	5 44.8	1.26129	1.27383	8.13	0.9102
27	0.7399	2.371	0.009	328 2.7	21 52.2	85 7.7	5 40.5	1.26232	1.27393	8.12	0.9096
28	0.7427	2.378	+0.003	328 0.0	21 52.0	84 3.5	5 36.2	1.26279	1.27405	8.11	0.9090
29	0.7454	2.384	−0.003	328 1.2	21 52.1	82 59.3	5 32.0	1.26280	1.27419	8.10	0.9082
30	0.7481	+2.391	−0.009	328 7.0	21 52.5	81 55.1	5 27.7	1.26259	1.27436	+8.08	+0.9073
Oct. 1	0.7509	+2.398	−0.012	328 17.5	21 53.2	80 50.9	5 23.4	1.26243	1.27455	+8.06	+0.9063

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)		τ	f	f′	G		H		Log g.	Log h.	i	Log i.
			In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
		y	s	s	° ′	h m	° ′	h m			″	
Oct.	1	0.7509	+2.398	−0.012	328 17.5	21 53.2	80 50.9	5 23.4	1.26243	1.27455	+8.06	+0.9063
	2	0.7536	2.405	0.011	328 31.5	21 54.1	79 46.9	5 19.1	1.26263	1.27476	8.04	0.9051
	3	0.7564	2.412	0.008	328 47.0	21 55.1	78 42.8	5 14.8	1.26330	1.27500	8.01	0.9038
	4	0.7591	2.419	−0.002	329 1.6	21 56.1	77 38.7	5 10.6	1.26448	1.27526	7.99	0.9024
h	5	0.7618	2.425	+0.005	329 13.3	21 56.9	76 34.7	5 6.3	1.26605	1.27554	7.96	0.9008
(1.0)	6	0.7646	+2.432	+0.011	329 21.2	21 57.4	75 30.8	5 2.1	1.26781	1.27584	+7.93	+0.8991
	7	0.7673	2.439	0.016	329 25.2	21 57.7	74 26.9	4 57.8	1.26957	1.27616	7.89	0.8972
	8	0.7700	2.446	0.018	329 25.7	21 57.7	73 23.1	4 53.5	1.27114	1.27651	7.86	0.8953
	9	0.7728	2.453	0.017	329 24.2	21 57.6	72 19.3	4 49.3	1.27234	1.27687	7.82	0.8931
	10	0.7755	2.461	0.013	329 22.1	21 57.5	71 15.6	4 45.0	1.27316	1.27726	7.78	0.8909
	11	0.7782	+2.468	+0.008	329 20.8	21 57.4	70 12.0	4 40.8	1.27362	1.27766	+7.74	+0.8885
	12	0.7810	2.475	+0.002	329 21.3	21 57.4	69 8.5	4 36.6	1.27372	1.27808	7.69	0.8859
	13	0.7837	2.482	−0.005	329 24.4	21 57.6	68 5.1	4 32.3	1.27361	1.27852	7.64	0.8832
	14	0.7865	2.490	0.011	329 30.8	21 58.1	67 1.8	4 28.1	1.27339	1.27898	7.59	0.8804
	15	0.7892	2.497	0.015	329 40.6	21 58.7	65 58.6	4 23.9	1.27321	1.27945	7.54	0.8774
	16	0.7919	+2.505	−0.017	329 53.3	21 59.6	64 55.5	4 19.7	1.27325	1.27994	+7.49	+0.8742
	17	0.7947	2.512	0.016	330 7.8	22 0.5	63 52.5	4 15.5	1.27368	1.28045	7.43	0.8709
	18	0.7974	2.520	0.013	330 22.5	22 1.5	62 49.6	4 11.3	1.27457	1.28097	7.37	0.8674
	19	0.8002	2.528	−0.007	330 36.0	22 2.4	61 46.8	4 7.1	1.27594	1.28151	7.31	0.8638
h	20	0.8029	2.536	0.000	330 46.8	22 3.1	60 44.1	4 2.9	1.27769	1.28206	7.24	0.8600
(2.0)	21	0.8056	+2.544	+0.006	330 53.5	22 3.6	59 41.5	3 58.8	1.27961	1.28262	+7.18	+0.8561
	22	0.8084	2.551	0.010	330 56.3	22 3.8	58 39.1	3 54.6	1.28147	1.28319	7.11	0.8519
	23	0.8111	2.559	0.012	330 56.0	22 3.7	57 36.8	3 50.5	1.28305	1.28378	7.04	0.8476
	24	0.8138	2.568	0.009	330 54.6	22 3.6	56 34.7	3 46.3	1.28415	1.28437	6.97	0.8431
	25	0.8166	2.576	+0.004	330 54.1	22 3.6	55 32.6	3 42.2	1.28473	1.28498	6.89	0.8385
	26	0.8193	+2.584	−0.002	330 56.5	22 3.8	54 30.7	3 38.0	1.28487	1.28559	+6.82	+0.8336
	27	0.8221	2.592	0.008	331 3.4	22 4.2	53 29.0	3 33.9	1.28478	1.28621	6.74	0.8286
	28	0.8248	2.601	0.012	331 15.0	22 5.0	52 27.4	3 29.8	1.28472	1.28684	6.66	0.8233
	29	0.8275	2.609	0.013	331 30.2	22 6.0	51 25.9	3 25.7	1.28494	1.28747	6.58	0.8179
	30	0.8303	2.617	0.010	331 47.5	22 7.2	50 24.6	3 21.6	1.28562	1.28812	6.49	0.8122
	31	0.8330	+2.626	−0.005	332 4.7	22 8.3	49 23.4	3 17.6	1.28683	1.28876	+6.40	+0.8064
Nov.	1	0.8358	2.635	+0.002	332 19.5	22 9.3	48 22.4	3 13.5	1.28845	1.28941	6.31	0.8003
	2	0.8385	2.644	0.009	332 30.4	22 10.0	47 21.5	3 9.4	1.29032	1.29006	6.22	0.7940
	3	0.8412	2.653	0.014	332 37.3	22 10.5	46 20.8	3 5.4	1.29223	1.29072	6.13	0.7874
h	4	0.8440	2.663	0.017	332 40.8	22 10.7	45 20.3	3 1.4	1.29397	1.29137	6.04	0.7807
(3.0)	5	0.8467	+2.672	+0.018	332 42.0	22 10.8	44 19.9	2 57.3	1.29541	1.29203	+5.94	+0.7737
	6	0.8494	2.681	0.015	332 42.3	22 10.8	43 19.7	2 53.3	1.29648	1.29268	5.84	0.7664
	7	0.8522	2.690	0.010	332 43.0	22 10.9	42 19.6	2 49.3	1.29718	1.29334	5.74	0.7589
	8	0.8549	2.700	+0.004	332 45.1	22 11.0	41 19.7	2 45.3	1.29757	1.29399	5.64	0.7510
	9	0.8576	2.710	−0.003	332 49.6	22 11.3	40 19.9	2 41.3	1.29775	1.29464	5.53	0.7430
	10	0.8604	+2.719	−0.009	332 57.3	22 11.8	39 20.3	2 37.4	1.29783	1.29529	+5.43	+0.7346
	11	0.8631	2.729	0.014	333 7.9	22 12.5	38 20.8	2 33.4	1.29794	1.29593	5.32	0.7259
	12	0.8659	2.739	0.016	333 21.1	22 13.4	37 21.5	2 29.4	1.29827	1.29657	5.21	0.7169
	13	0.8686	2.749	0.016	333 36.1	22 14.4	36 22.3	2 25.5	1.29891	1.29720	5.10	0.7076
	14	0.8713	2.759	0.013	333 51.8	22 15.5	35 23.3	2 21.6	1.29998	1.29783	4.99	0.6979
	15	0.8741	+2.769	−0.008	334 6.5	22 16.4	34 24.4	2 17.6	1.30151	1.29845	+4.87	+0.6878
	16	0.8768	+2.779	−0.001	334 18.7	22 17.2	33 25.7	2 13.7	1.30340	1.29906	+4.76	+0.6774

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f	f′	G		H		Log g.	Log h.	i	Log i.
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	° ′	h m	° ′	h m			″	
Nov. 16	0.8768	+2.779	−0.001	334 18.7	22 17.2	33 25.7	2 13.7	1.30340	1.29906	+4.76	+0.6774
17	0.8796	2.789	+0.005	334 27.0	22 17.8	32 27.1	2 9.8	1.30554	1.29966	4.64	0.6666
18	0.8823	2.800	0.010	334 31.4	22 18.1	31 28.6	2 5.9	1.30770	1.30025	4.52	0.6553
h 19	0.8850	2.811	0.012	334 32.5	22 18.2	30 30.2	2 2.0	1.30958	1.30084	4.40	0.6436
(4.0) 20	0.8878	2.822	0.011	334 31.9	22 18.1	29 32.0	1 58.1	1.31105	1.30141	4.28	0.6315
21	0.8905	+2.832	+0.007	334 31.5	22 18.1	28 33.9	1 54.3	1.31203	1.30197	+4.16	+0.6188
22	0.8932	2.843	0.000	334 33.7	22 18.2	27 36.0	1 50.4	1.31256	1.30252	4.03	0.6056
23	0.8960	2.854	−0.006	334 39.8	22 18.7	26 38.1	1 46.5	1.31286	1.30306	3.91	0.5919
24	0.8987	2.865	0.012	334 50.1	22 19.3	25 40.4	1 42.7	1.31314	1.30358	3.78	0.5776
25	0.9015	2.876	0.014	335 4.3	22 20.3	24 42.8	1 38.9	1.31364	1.30409	3.65	0.5626
26	0.9042	+2.887	−0.013	335 20.5	22 21.4	23 45.2	1 35.0	1.31457	1.30459	+3.52	+0.5470
27	0.9069	2.898	0.008	335 36.9	22 22.5	22 47.8	1 31.2	1.31600	1.30507	3.39	0.5306
28	0.9097	2.909	−0.001	335 51.2	22 23.4	21 50.5	1 27.4	1.31787	1.30553	3.26	0.5134
29	0.9124	2.921	+0.006	336 2.1	22 24.1	20 53.3	1 23.6	1.32003	1.30598	3.13	0.4954
30	0.9152	2.932	0.012	336 9.2	22 24.6	19 56.2	1 19.8	1.32227	1.30642	3.00	0.4764
Dec. 1	0.9179	+2.944	+0.016	336 12.7	22 24.8	18 59.2	1 16.0	1.32439	1.30684	+2.86	+0.4565
2	0.9206	2.955	0.018	336 13.7	22 24.9	18 2.3	1 12.2	1.32620	1.30724	2.72	0.4354
3	0.9234	2.966	0.016	336 13.3	22 24.9	17 5.5	1 8.4	1.32765	1.30762	2.59	0.4131
4	0.9261	2.978	0.012	336 13.0	22 24.9	16 8.7	1 4.6	1.32875	1.30798	2.45	0.3894
h 5	0.9288	2.990	+0.006	336 14.2	22 24.9	15 12.1	1 0.8	1.32954	1.30833	2.31	0.3643
(5.0) 6	0.9316	+3.002	−0.001	336 17.6	22 25.2	14 15.5	0 57.0	1.33011	1.30865	+2.18	+0.3374
7	0.9343	3.013	0.007	336 23.3	22 25.6	13 19.0	0 53.3	1.33059	1.30896	2.04	0.3086
8	0.9370	3.025	0.012	336 31.7	22 26.1	12 22.6	0 49.5	1.33110	1.30925	1.90	0.2776
9	0.9398	3.037	0.016	336 42.7	22 26.8	11 26.2	0 45.7	1.33176	1.30952	1.75	0.2441
10	0.9425	3.049	0.016	336 55.2	22 27.7	10 29.9	0 42.0	1.33268	1.30977	1.61	0.2076
11	0.9453	+3.062	−0.014	337 8.3	22 28.6	9 33.6	0 38.2	1.33400	1.30999	+1.47	+0.1676
12	0.9480	3.074	0.010	337 20.6	22 29.4	8 37.4	0 34.5	1.33574	1.31020	1.33	0.1234
13	0.9507	3.086	−0.003	337 30.9	22 30.1	7 41.2	0 30.7	1.33782	1.31039	1.19	0.0740
14	0.9535	3.098	+0.004	337 37.7	22 30.5	6 45.0	0 27.0	1.34011	1.31055	1.04	0.0180
15	0.9562	3.110	0.010	337 41.0	22 30.7	5 48.9	0 23.3	1.34244	1.31070	0.90	9.9536
16	0.9590	+3.123	+0.013	337 40.9	22 30.7	4 52.8	0 19.5	1.34461	1.31082	+0.76	+9.8779
17	0.9617	3.135	0.013	337 38.5	22 30.6	3 56.7	0 15.8	1.34641	1.31092	0.61	9.7858
18	0.9644	3.148	0.009	337 36.0	22 30.4	3 0.6	0 12.0	1.34774	1.31101	0.47	9.6686
19	0.9672	3.160	+0.003	337 35.2	22 30.3	2 4.6	0 8.3	1.34862	1.31106	0.32	9.5073
h 20	0.9699	3.173	−0.004	337 37.6	22 30.5	1 8.5	0 4.6	1.34922	1.31110	0.18	9.2477
(6.0) 21	0.9726	+3.185	−0.010	337 43.8	22 30.9	0 12.4	0 0.8	1.34974	1.31112	+0.03	+8.5059
22	0.9754	3.197	0.013	337 53.8	22 31.6	359 16.3	23 57.1	1.35042	1.31111	−0.11	−9.0523
23	0.9781	3.209	0.013	338 6.2	22 32.4	358 20.2	23 53.3	1.35148	1.31108	0.26	9.4110
24	0.9809	3.221	0.010	338 18.7	22 33.2	357 24.1	23 49.6	1.35297	1.31103	0.40	9.6047
25	0.9836	3.233	−0.004	338 30.0	22 34.0	356 28.0	23 45.9	1.35486	1.31096	0.55	9.7381
26	0.9863	+3.246	+0.003	338 38.3	22 34.6	355 31.8	23 42.1	1.35705	1.31087	−0.69	−9.8399
27	0.9891	3.258	0.010	338 43.0	22 34.9	354 35.6	23 38.4	1.35936	1.31076	0.84	9.9222
28	0.9918	3.270	0.015	338 44.1	22 35.0	353 39.4	23 34.6	1.36158	1.31062	0.98	9.9913
29	0.9946	3.283	0.017	338 42.7	22 34.8	352 43.1	23 30.9	1.36352	1.31046	1.12	0.0507
30	0.9973	3.295	0.016	338 40.0	22 34.7	351 46.8	23 27.1	1.36513	1.31028	1.27	0.1029
31	1.0000	+3.307	+0.013	338 37.2	22 34.5	350 50.4	23 23.4	1.36643	1.31008	−1.41	−0.1493
32	1.0028	+3.319	+0.007	338 35.0	22 34.3	349 54.0	23 19.6	1.36741	1.30986	−1.55	−0.1911

BESSELIAN AND INDEPENDENT STAR-NUMBERS, 1913.

FOR WASHINGTON SIDEREAL TWELVE HOURS.

Mean Solar Date.	Log A_1.	Log B_1.	Log C.	Log D.	f	G_1	H	Log g_1.	Log h.	Log i.
					s	° ′	° ′			
Jan. 0.72	−8.5367	−0.9303	−0.5317	+1.3039	−0.106	265 22	350 24	0.9317	1.3100	−0.1690
10.69	+7.6117	0.9360	0.8201	1.2824	+0.012	270 33	340 58	0.9360	1.3068	0.4574
20.67	8.6069	0.9442	0.9825	1.2453	0.124	275 16	331 22	0.9460	1.3019	0.6198
30.64	8.8695	0.9537	1.0897	1.1896	0.227	279 23	321 32	0.9595	1.2959	0.7270
Feb. 9.61	9.0190	0.9633	1.1642	1.1100	0.321	282 50	311 26	0.9743	1.2893	0.8015
19.58	+9.1200	−0.9720	−1.2158	+0.9957	+0.405	285 44	301 4	0.9886	1.2830	−0.8531
Mar. 1.56	9.1946	0.9789	1.2496	0.8217	0.481	288 14	290 28	1.0013	1.2779	0.8869
11.53	9.2538	0.9832	1.2684	+0.5019	0.551	290 30	279 43	1.0116	1.2747	0.9057
21.50	9.3038	0.9846	1.2736	−9.5502	0.618	292 41	268 55	1.0196	1.2737	0.9109
31.48	9.3489	0.9831	1.2658	0.5861	0.686	294 57	258 12	1.0257	1.2751	0.9031
Apr. 10.45	+9.3916	−0.9789	−1.2448	−0.8588	+0.757	297 24	247 39	1.0306	1.2787	−0.8821
20.42	9.4336	0.9723	1.2094	1.0156	0.834	300 6	237 23	1.0353	1.2839	0.8466
30.39	9.4754	0.9643	1.1572	1.1202	0.918	303 2	227 26	1.0410	1.2900	0.7945
May 10.37	9.5172	0.9558	1.0838	1.1939	1.011	306 8	217 49	1.0486	1.2963	0.7211
20.34	9.5585	0.9477	0.9807	1.2459	1.112	309 17	208 30	1.0589	1.3020	0.6179
30.31	+9.5988	−0.9407	−0.8289	−1.2811	+1.220	312 21	199 27	1.0721	1.3066	−0.4662
June 9.28	9.6373	0.9360	0.5732	1.3023	1.333	315 13	190 34	1.0881	1.3098	0.2106
19.26	9.6737	0.9338	−9.8112	1.3109	1.449	317 46	181 49	1.1063	1.3111	−9.4484
29.23	9.7074	0.9346	+0.3914	1.3074	1.566	319 55	173 5	1.1258	1.3105	+0.0287
July 9.20	9.7380	0.9381	0.7407	1.2916	1.681	321 40	164 18	1.1455	1.3082	0.3780
19.18	+9.7656	−0.9439	+0.9241	−1.2627	+1.791	323 3	155 22	1.1649	1.3041	+0.5613
29.15	9.7901	0.9515	1.0438	1.2186	1.895	324 7	146 14	1.1834	1.2988	0.6810
Aug. 8.12	9.8115	0.9597	1.1279	1.1557	1.991	324 56	136 50	1.2004	1.2928	0.7652
18.09	9.8302	0.9677	1.1882	1.0674	2.079	325 36	127 8	1.2157	1.2866	0.8254
28.07	9.8466	0.9746	1.2304	0.9398	2.158	326 11	117 8	1.2291	1.2810	0.8676
Sept. 7.04	+9.8611	−0.9798	+1.2576	−0.7382	+2.232	326 45	106 50	1.2408	1.2766	+0.8948
17.01	9.8743	0.9825	1.2714	−0.3156	2.301	327 23	96 19	1.2509	1.2741	0.9087
26.98	9.8867	0.9824	1.2726	+0.1508	2.368	328 8	85 41	1.2597	1.2739	0.9099
Oct. 6.96	9.8991	0.9793	1.2610	0.6882	2.436	329 2	75 2	1.2678	1.2760	0.8982
16.93	9.9118	0.9737	1.2356	0.9146	2.508	330 5	64 28	1.2758	1.2802	0.8728
26.90	+9.9253	−0.9657	+1.1943	+1.0540	+2.588	331 18	54 6	1.2843	1.2858	+0.8316
Nov. 5.88	9.9398	0.9562	1.1337	1.1495	2.676	332 37	43 57	1.2935	1.2923	0.7710
15.85	9.9554	0.9463	1.0470	1.2169	2.773	333 58	34 4	1.3039	1.2987	0.6842
25.82	9.9718	0.9371	0.9204	1.2636	2.880	335 16	24 24	1.3155	1.3042	0.5577
Dec. 5.79	9.9887	0.9298	0.7193	1.2935	2.994	336 28	14 56	1.3284	1.3084	0.3566
15.76	+0.0058	−0.9252	+0.2976	+1.3087	+3.114	337 29	5 34	1.3422	1.3107	+9.9348
25.74	0.0224	0.9240	−0.1273	1.3100	3.236	338 19	356 15	1.3563	1.3110	−9.7646
35.71	+0.0384	−0.9263	−0.6652	+1.2975	+3.357	338 55	346 52	1.3705	1.3090	−0.3025

$E = 0^s.000$

The above numbers give the same reductions from mean to apparent place as are employed in computing the apparent places of the fixed stars, given on pages 287 to 486, from the mean places, given on pages 233 to 250. In order to render exact interpolation possible through intervals of ten days, all short period terms have been omitted.

FOR WASHINGTON MEAN MIDNIGHT.

Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$
	″	″		″	″		″	″		″	″
Jan. 0	−0.12	+0.07	Feb. 15	−0.13	−0.11	Apr. 1	+0.24	+0.02	May 16	−0.11	+0.09
1	0.17	+0.02	16	−0.01	0.11	2	0.19	0.06	17	0.18	0.06
2	0.17	−0.03	17	+0.12	0.08	3	+0.10	0.09	18	0.21	+0.01
3	0.12	0.07	18	0.20	−0.04	4	0.00	0.10	19	0.17	−0.04
4	−0.04	0.09	19	0.23	+0.02	5	−0.11	0.10	20	−0.10	0.08
5	+0.05	0.10	20	0.21	0.07	6	0.21	0.07	21	+0.01	0.10
6	0.14	0.09	21	0.13	0.10	7	0.27	+0.03	22	0.11	0.10
7	0.20	0.06	22	+0.03	0.11	8	0.29	−0.01	23	0.20	0.08
8	0.23	−0.03	23	−0.07	0.10	9	0.27	0.06	24	0.25	−0.05
9	0.22	+0.02	24	0.14	0.06	10	0.19	0.09	25	0.26	0.00
10	+0.17	+0.06	25	−0.16	+0.01	11	−0.08	−0.11	26	+0.22	+0.04
11	+0.08	0.09	26	0.14	−0.04	12	+0.04	0.10	27	0.16	0.07
12	−0.02	0.10	27	−0.07	0.08	13	0.15	0.07	28	+0.06	0.10
13	0.13	0.10	28	+0.02	0.10	14	0.20	−0.02	29	−0.05	0.10
14	0.23	0.08	Mar. 1	0.11	0.10	15	0.21	+0.03	30	0.15	0.09
15	0.30	+0.04	2	0.19	0.08	16	0.16	0.08	31	0.23	0.06
16	0.32	−0.01	3	0.24	0.05	17	+0.06	0.11	June 1	0.28	+0.02
17	0.29	0.06	4	0.25	−0.01	18	−0.04	0.11	2	0.28	−0.03
18	0.20	0.09	5	0.22	+0.03	19	0.13	0.08	3	0.23	0.07
19	−0.08	0.11	6	0.16	0.07	20	0.19	+0.04	4	0.14	0.10
20	+0.06	−0.10	7	+0.06	+0.09	21	−0.19	−0.01	5	−0.02	−0.11
21	0.17	0.07	8	−0.04	0.10	22	0.14	0.06	6	+0.11	0.09
22	0.24	−0.02	9	0.15	0.09	23	−0.05	0.09	7	0.20	−0.05
23	0.25	+0.03	10	0.24	0.06	24	+0.05	0.11	8	0.24	0.00
24	0.21	0.08	11	0.30	+0.02	25	0.15	0.10	9	0.22	+0.05
25	0.12	0.11	12	0.31	−0.03	26	0.22	0.07	10	0.15	0.09
26	+0.01	0.11	13	0.26	0.07	27	0.26	−0.03	11	+0.04	0.11
27	−0.09	0.08	14	0.17	0.10	28	0.25	+0.01	12	−0.07	0.10
28	0.15	+0.04	15	−0.05	0.11	29	0.21	0.05	13	0.16	0.07
29	0.16	−0.01	16	+0.07	0.09	30	0.13	0.08	14	0.21	+0.02
30	−0.13	−0.05	17	+0.16	−0.05	May 1	+0.03	+0.10	15	−0.19	−0.03
31	−0.06	0.09	18	0.21	0.00	2	−0.08	0.10	16	0.13	0.07
Feb. 1	+0.04	0.10	19	0.21	+0.05	3	0.17	0.08	17	−0.03	0.10
2	0.13	0.10	20	0.15	0.09	4	0.25	+0.05	18	+0.07	0.11
3	0.20	0.07	21	+0.04	0.11	5	0.28	0.00	19	0.17	0.09
4	0.23	−0.04	22	−0.06	0.10	6	0.27	−0.04	20	0.23	0.06
5	0.23	0.00	23	0.14	0.07	7	0.21	0.08	21	0.25	−0.02
6	0.19	+0.04	24	0.17	+0.02	8	−0.10	0.11	22	0.23	+0.03
7	0.12	0.08	25	0.16	−0.03	9	+0.02	0.11	23	0.18	0.06
8	+0.02	0.10	26	0.10	0.07	10	0.13	0.08	24	+0.09	0.09
9	−0.09	+0.10	27	−0.01	−0.10	11	+0.20	−0.04	25	−0.02	+0.10
10	0.20	0.08	28	+0.09	0.10	12	0.22	+0.02	26	0.13	0.09
11	0.28	0.05	29	0.18	0.09	13	0.19	0.07	27	0.22	0.07
12	0.32	+0.01	30	0.24	0.06	14	+0.10	0.10	28	0.28	+0.03
13	0.31	−0.04	31	0.26	−0.02	15	−0.01	0.11	29	0.30	−0.02
14	0.24	0.08	Apr. 1	0.24	+0.02	16	0.11	0.09	30	0.26	0.06
15	−0.13	−0.11	2	+0.19	+0.06	17	−0.18	+0.06	July 1	−0.18	−0.09

FOR WASHINGTON MEAN MIDNIGHT.

Date.	δ″ψ	δ″ω	Date.	δ″ψ	δ″ω	Date.	δ″ψ	δ″ω	Date.	δ″ψ	δ″ω
	″	″		″	″		″	″		″	″
July 1	−0.18	−0.09	Aug. 16	+0.21	+0.04	Oct. 1	−0.19	+0.04	Nov. 16	−0.02	−0.11
2	−0.06	0.11	17	0.15	0.08	2	0.18	−0.01	17	+0.08	0.09
3	+0.06	0.10	18	+0.06	0.10	3	0.13	0.06	18	0.17	−0.05
4	0.17	0.07	19	−0.06	0.10	4	−0.03	0.10	19	0.20	0.00
5	0.23	−0.02	20	0.16	0.08	5	+0.08	0.11	20	0.18	+0.05
6	0.24	+0.04	21	0.25	0.05	6	0.18	0.10	21	+0.11	0.09
7	0.19	0.08	22	0.29	+0.01	7	0.25	0.07	22	0.00	0.11
8	+0.09	0.11	23	0.30	−0.03	8	0.29	−0.02	23	−0.11	0.10
9	−0.02	0.11	24	0.25	0.07	9	0.27	+0.02	24	0.19	0.07
10	0.12	0.08	25	0.16	0.10	10	0.22	0.06	25	0.23	+0.02
11	−0.18	+0.04	26	−0.05	−0.11	11	+0.13	+0.09	26	−0.20	−0.03
12	0.19	−0.01	27	+0.07	0.09	12	+0.03	0.10	27	0.13	0.08
13	0.14	0.06	28	0.16	−0.05	13	−0.08	0.09	28	−0.02	0.10
14	−0.06	0.09	29	0.21	0.00	14	0.18	0.07	29	+0.10	0.11
15	+0.05	0.11	30	0.20	+0.05	15	0.25	+0.04	30	0.20	0.09
16	0.14	0.10	31	0.14	0.09	16	0.28	−0.01	Dec. 1	0.27	0.05
17	0.22	0.07	Sept. 1	+0.04	0.11	17	0.26	0.05	2	0.29	−0.01
18	0.25	−0.03	2	−0.06	0.10	18	0.21	0.09	3	0.26	+0.04
19	0.24	+0.01	3	0.14	0.07	19	−0.11	0.11	4	0.19	0.07
20	0.20	0.05	4	0.18	+0.02	20	0.00	0.10	5	+0.10	0.09
21	+0.12	+0.08	5	−0.16	−0.03	21	+0.10	−0.08	6	−0.01	+0.10
22	+0.01	0.10	6	−0.10	0.08	22	0.17	−0.03	7	0.12	0.09
23	−0.10	0.10	7	0.00	0.10	23	0.19	+0.02	8	0.20	0.06
24	0.19	0.08	8	+0.11	0.11	24	0.15	0.07	9	0.25	+0.02
25	0.27	+0.04	9	0.20	0.09	25	+0.07	0.10	10	0.27	−0.02
26	0.30	0.00	10	0.26	0.05	26	−0.03	0.11	11	0.23	0.06
27	0.29	−0.05	11	0.28	−0.01	27	0.13	0.09	12	0.16	0.09
28	0.22	0.08	12	0.25	+0.03	28	0.20	+0.06	13	−0.05	0.11
29	−0.12	0.11	13	0.18	0.07	29	0.21	0.00	14	+0.06	0.10
30	0.00	0.10	14	+0.09	0.09	30	0.17	−0.05	15	0.16	0.06
31	+0.12	−0.08	15	−0.01	+0.10	31	−0.08	−0.09	16	+0.21	−0.02
Aug. 1	0.20	−0.04	16	0.12	0.09	Nov. 1	+0.03	0.11	17	0.21	+0.04
2	0.23	+0.02	17	0.21	0.07	2	0.14	0.10	18	0.15	0.08
3	0.20	0.07	18	0.27	+0.03	3	0.23	0.08	19	+0.05	0.11
4	0.12	0.10	19	0.29	−0.02	4	0.28	−0.04	20	−0.06	0.11
5	+0.02	0.11	20	0.26	0.06	5	0.29	+0.01	21	0.16	0.08
6	−0.09	0.10	21	0.19	0.09	6	0.24	0.05	22	0.22	+0.04
7	0.16	+0.06	22	−0.09	0.11	7	0.17	0.08	23	0.22	−0.02
8	0.18	0.00	23	+0.03	0.10	8	+0.07	0.10	24	0.16	0.06
9	0.15	−0.05	24	0.12	0.07	9	−0.04	0.10	25	−0.07	0.10
10	−0.08	−0.09	25	+0.18	−0.02	10	−0.14	+0.08	26	+0.05	−0.11
11	+0.03	0.11	26	0.19	+0.04	11	0.22	0.05	27	0.16	0.10
12	0.13	0.10	27	0.14	0.08	12	0.26	+0.01	28	0.24	0.06
13	0.21	0.08	28	+0.05	0.11	13	0.26	−0.04	29	0.28	−0.02
14	0.26	−0.04	29	−0.05	0.11	14	0.22	0.08	30	0.26	+0.02
15	0.26	0.00	30	0.14	0.08	15	0.13	0.10	31	0.21	0.06
16	+0.21	+0.04	Oct. 1	−0.19	+0.04	16	−0.02	−0.11	32	+0.12	+0.09

WASHINGTON, JANUARY $0^d.248$.

Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
33 Piscium	4.7	0	0	52.969	+ 3.0715	− 6	11	39.31	+20.136
α Andromedæ (*Alpheratz*)	2.2	0	3	53.258	3.0957	+28	36	36.47	19.880
β Cassiopeiæ	2.4	0	4	31.687	3.1840	+58	40	11.83	19.861
ε Phœnicis	3.9	0	4	59.884	3.0518	−46	13	39.11	19.848
22 Andromedæ	5.1	0	5	47.680	3.1091	+45	35	17.31	20.035
γ Pegasi	2.9	0	8	45.248	+ 3.0862	+14	41	59.77	+20.021
σ Andromedæ	4.5	0	13	46.740	3.1271	+36	18	10.48	19.963
ι Ceti	3.8	0	14	59.731	3.0570	− 9	18	22.07	19.973
ζ Tucanæ	4.3	0	15	32.892	3.1491	−65	23	8.63	21.172
44 Piscium	6.0	0	20	56.538	3.0743	+ 1	27	28.44	19.939
β Hydri	2.9	0	21	11.823	+ 3.2029	−77	44	39.20	+20.278
α Phœnicis	2.4	0	21	59.227	2.9729	−42	46	42.40	19.551
12 Ceti	6.0	0	25	35.947	3.0621	− 4	26	16.33	19.920
13 Ceti †	5.2	0	30	46.167	3.0871	− 4	4	17.72	19.848
ζ Cassiopeiæ	3.7	0	32	7.076	3.3278	+53	25	5.71	19.842
π Andromedæ	4.4	0	32	13.829	+ 3.1972	+33	14	26.07	+19.848
ε Andromedæ	4.5	0	33	57.295	3.1640	+28	50	22.26	19.572
δ Andromedæ	3.5	0	34	40.340	3.2017	+30	23	5.70	19.720
α Cassiop. (*Schedir*) †	*var.*	0	35	33.725	3.3858	+56	3	37.32	19.773
μ Phœnicis	4.6	0	37	12.926	2.8398	−46	33	46.17	19.750
β Ceti	2.2	0	39	13.394	+ 3.0126	−18	27	50.02	+19.794
ο Cassiopeiæ	4.7	0	39	52.291	3.3306	+47	48	30.35	19.737
21 Cassiopeiæ	5.6	0	39	52.886	3.9026	+74	30	45.79	19.717
ζ Andromedæ	4.3	0	42	43.448	3.1744	+23	47	38.66	19.621
η Cassiopeiæ †	3.6	0	43	49.737	3.6123	+57	21	18.74	19.204
δ Piscium	4.6	0	44	10.031	+ 3.1100	+ 7	6	42.47	+19.630
λ Hydri	5.0	0	45	34.854	2.1018	−75	23	48.17	19.650
20 Ceti	4.9	0	48	33.619	3.0641	− 1	36	58.84	19.594
γ Cassiopeiæ	2.2	0	51	26.840	3.5965	+60	14	45.09	19.538
μ Andromedæ	3.9	0	51	55.175	3.3205	+38	1	39.55	19.564
α Sculptoris	4.4	0	54	24.808	+ 2.8907	−29	49	39.57	+19.471
43 H. Cephei	4.5	0	56	38.823	7.5880	+85	47	27.59	19.432
ε Piscium	4.4	0	58	25.585	3.1111	+ 7	25	19.06	19.424
β Phœnicis †	3.4	1	2	12.087	2.6801	−47	11	5.20	19.288
μ Cassiopeiæ	5.3	1	2	28.327	3.9685	+54	29	38.75	17.750
η Ceti	3.6	1	4	12.792	+ 3.0174	−10	38	35.20	+19.139
β Andromedæ	2.4	1	4	51.359	3.3502	+35	9	34.34	19.131
τ Piscium	4.7	1	6	51.902	3.2968	+29	37	40.88	19.170
ζ Piscium †	5.6	1	9	11.070	3.1317	+ 7	6	56.03	19.087
κ Tucanæ †	5.0	1	12	49.151	2.0399	−69	20	17.78	19.131
f Piscium	5.3	1	13	18.618	+ 3.0924	+ 3	9	23.65	+19.003
υ Piscium	4.7	1	14	40.856	3.2903	+26	48	25.45	18.983
θ Ceti	3.8	1	19	40.453	2.9977	− 8	37	55.19	18.632
δ Cassiopeiæ	2.8	1	20	6.841	3.8991	+59	47	1.10	18.797
γ Phœnicis	3.4	1	24	35.284	2.6080	−43	45	50.10	18.471
38 Cassiopeiæ	6.0	1	24	44.152	+ 4.4126	+69	49	2.48	+18.619
η Piscium	3.7	1	26	49.512	3.2056	+14	53	51.59	18.622
α Ursæ Min. (*Polaris*) †	2.1	1	28	19.01*	+28.0572	+88	50	29.36	+18.578

13 Ceti, dup. $5^m.5$, $6^m.2$, 0″.3
α Cassiop., var. irreg. $2^m.2$, $2^m.8$
η Cassiop. comp, $7^m.6$, 5″ s. pr.

β Phœnicis, dup. $4^m.1$, $4^m.1$, 1″.
ζ Piscium, star $6^m.5$, 24″ n.f.

κ Tucanæ, comp. 7^m, 6″ n.
α Ursæ Min. star 9^m, 18″s. pr.

WASHINGTON, JANUARY $0^d.248$

Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
40 Cassiopeiæ	5.5	1 31 32.375	+4.7295	+72 35 49.85	+18.466
υ Andromedæ	4.2	1 31 41.107	3.5092	+40 58 14.55	18.086
π Piscium	5.6	1 32 29.044	3.1763	+11 41 48.48	18.470
υ Persei	3.8	1 32 38.686	3.6665	+48 11 16.04	18.310
α Eridani (*Achernar*)	0.6	1 34 28.506	2.2366	−57 40 42.96	18.326
ω Cassiopeiæ	5.5	1 35 52.804	+4.3989	+67 36 12.57	+18.315
ν Piscium	4.7	1 36 54.138	3.1195	+ 5 2 51.83	18.284
φ Persei	4.2	1 38 11.986	3.7433	+50 15 3.25	18.218
τ Ceti	3.6	1 40 1.548	2.7865	−16 23 42.92	19.025
ο Piscium	4.5	1 40 47.856	3.1648	+ 8 43 12.74	18.183
ε Sculptoris †	5.4	1 41 34.072	+2.8046	−25 29 13.04	+18.058
4 Octantis (G.)	5.6	1 42 17.46*	−3.8020	−85 12 33.92	18.110
ζ Ceti	3.9	1 47 9.943	+2.9600	−10 45 51.88	17.867
α Trianguli	3.6	1 48 7.092	3.4128	+29 9 19.64	17.625
ε Cassiopeiæ	3.4	1 48 7.349	4.2824	+63 14 31.86	17.842
ξ Piscium	4.8	1 49 3.008	+3.1036	+ 2 45 30.41	+17.840
β Arietis	2.7	1 49 49.824	3.3080	+20 22 59.35	17.677
ψ Phœnicis	4.4	1 50 9.387	2.4038	−46 43 43.53	17.670
υ Ceti	4.2	1 55 54.315	2.8258	−21 29 56.22	17.528
50 Cassiopeiæ	4.1	1 55 58.782	5.0572	+72 0 3.32	17.553
α Hydri	3.0	1 56 1.317	+1.8819	−61 59 34.61	+17.558
γ Andromedæ *pr.*	2.3	1 58 33.178	3.6704	+41 54 45.99	17.373
γ Andromedæ *seq.*	5.1	$\Delta\alpha$ + 0.890	. . .	$\Delta\delta$ + 4.67	. . .
α Arietis	2.2	2 2 15.924	3.3757	+23 3 5.55	17.116
β Trianguli	3.1	2 4 21.720	3.5609	+34 34 34.52	17.122
55 Cassiopeiæ	6.2	2 7 38.278	+4.6659	+66 7 2.24	+17.014
6 Persei	5.4	2 7 48.663	3.9723	+50 39 43.92	16.842
ξ^1 Ceti	4.5	2 8 23.202	3.1767	+ 8 26 20.25	16.966
μ Fornacis	5.2	2 9 4.355	2.6379	−31 7 54.73	16.928
γ Trianguli	4.1	2 12 8.257	3.5578	+33 26 43.24	16.753
67 Ceti	5.7	2 12 38.571	+2.9905	− 6 49 21.69	+16.671
φ Eridani	3.8	2 13 23.991	2.1413	−51 54 52.73	16.716
ο Ceti (*Mira*) †	*var.*	2 14 57.034	3.0290	− 3 22 19.57	16.441
κ Fornacis	5.4	2 18 33.667	2.7448	−24 12 40.94	16.415
δ Hydri	4.3	2 20 11.784	1.0578	−69 3 18.20	16.430
ι Cassiopeiæ †	4.6	2 21 52.898	+4.9003	+67 0 43.19	+16.336
ξ^2 Ceti	4.3	2 23 31.872	3.1862	+ 8 4 14.27	16.235
σ Ceti	4.8	2 27 57.750	2.8414	−15 37 33.07	15.909
36 H. Cassiopeiæ	5.3	2 29 44.075	5.6341	+72 26 19.00	15.935
ν Ceti	5.0	2 31 18.386	+3.1449	+ 5 12 51.12	15.815
μ Hydri	5.3	2 33 29.124	−1.3560	−79 29 20.83	+15.678
ν Arietis	5.4	2 33 52.400	+3.4016	+21 35 8.62	15.674
δ Ceti	4.0	2 35 1.315	3.0730	− 0 2 46.27	15.636
ε Hydri	4.3	2 38 14.807	0.9132	−68 38 22.58	15.459
θ Persei	4.2	2 38 15.027	4.0823	+48 51 40.32	15.366
γ Ceti *seq.* †	3.7	2 38 47.453	+3.1057	+ 2 52 10.89	+15.273
π Ceti	4.4	2 39 58.854	2.8537	−14 13 35.87	15.345
μ Ceti	4.4	2 40 14.196	+3.2391	+ 9 44 50.84	+15.318

ε Sculptoris, comp. 9^m, 5″ n. f.
ο Ceti, var., 331^d, $1^m.7$–$9^m.6$, star 9^m f. 8^s

ι Cassiop., triple, 7^m, 8^m, 2″, 8″

γ Ceti, comp., $6^m.2$, 2″.7 pr.

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Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
η Persei . . . †	3.9	2	44	20.514	+4.3562	+55	32	6.75	+15.097
41 Arietis . . .	3.7	2	44	51.533	3.5244	+26	54	9.31	14.968
β Fornacis . . .	4.5	2	45	26.968	2.5121	−32	46	15.34	15.201
σ Arietis . . .	5.5	2	46	41.196	3.3077	+14	43	26.58	14.939
τ^2 Eridani . . .	4.8	2	47	5.453	2.7199	−21	21	43.32	14.933
τ Persei . . .	4.1	2	48	4.865	+4.2353	+52	24	25.92	+14.889
η Eridani . . .	4.0	2	52	10.608	2.9301	− 9	14	37.82	14.437
ε Arietis (*mean*) . . †	4.6	2	54	14.034	3.4250	+20	59	34.63	14.517
47 H. Cephei . . .	5.7	2	54	28.216	7.8391	+79	4	34.50	14.522
θ Eridani . . . †	3.4	2	54	57.857	2.2767	−40	39	10.35	14.507
α Ceti . . .	2.8	2	57	43.790	+3.1330	+ 3	44	56.38	+14.236
γ Persei . . .	3.1	2	58	29.224	4.3268	+53	9	59.72	14.264
τ^3 Eridani . . .	4.2	2	58	33.365	2.6448	−23	57	53.61	14.220
ρ Persei . . . †	*var.*	2	59	35.776	3.8346	+38	30	13.64	14.084
μ Horologii . . .	5.2	3	1	33.547	1.4074	−60	4	28.96	14.024
θ Hydri . . .	5.5	3	2	3.924	+0.0987	−72	14	31.93	+14.060
β Persei . (*Algol*) †	*var.*	3	2	30.150	3.8927	+40	37	16.39	14.017
δ Arietis . . .	4.5	3	6	39.084	3.4258	+19	23	54.19	13.758
12 Eridani . . . †	4.0	3	8	22.468	2.5466	−29	19	46.56	14.283
48 H. Cephei . . .	5.5	3	9	14.359	7.4934	+77	24	59.34	13.537
ζ Arietis . . .	5.0	3	9	53.856	+3.4433	+20	43	21.42	+13.467
38 Horologii (G.) . . †	5.7	3	10	20.734	1.5145	−57	38	49.64	13.514
ζ Eridani . . .	4.9	3	11	36.379	2.9122	− 9	8	32.07	13.493
τ Arietis . . .	5.2	3	16	12.091	3.4590	+20	50	2.60	13.105
e Eridani . . .	4.3	3	16	27.164	+2.3980	−43	24	7.10	13.879
ι Hydri . . .	5.5	3	18	6.249	−1.5573	−77	42	23.89	+13.052
α Persei . . .	1.9	3	18	6.259	+4.2680	+49	33	8.55	12.984
o Tauri . . .	3.8	3	20	7.762	3.2252	+ 8	43	24.15	12.803
2 H. Camelopardalis .	4.4	3	22	0.890	4.8356	+59	38	17.18	12.751
ξ Tauri . . .	3.8	3	22	27.134	3.2482	+ 9	25	47.63	12.674
f Tauri . . .	4.3	3	26	4.068	+3.3088	+12	38	21.23	+12.476
ε Eridani . . . †	3.8	3	28	49.841	2.8251	− 9	45	7.42	12.310
τ^5 Eridani . . .	4.3	3	29	56.609	2.6482	−21	55	27.08	12.168
δ Persei . . .	3.1	3	36	43.465	4.2591	+47	30	36.93	11.695
δ Eridani . . .	3.7	3	39	4.802	2.8729	−10	3	26.71	12.294
ν Persei . . .	3.9	3	39	16.710	+4.0662	+42	18	16.78	+11.549
5 H. Camelopardalis .	4.7	3	41	9.325	6.2808	+71	3	55.17	11.358
η Tauri . (*Alcyone*) †	3.0	3	42	18.596	3.5612	+23	50	12.62	11.282
τ^6 Eridani . . .	4.3	3	43	6.272	2.5806	−23	30	19.84	10.793
g Eridani . . .	4.2	3	46	11.944	+2.2451	−36	27	46.95	11.022
γ Hydri . . .	3.2	3	48	34.375	−0.9674	−74	30	20.92	+10.993
ζ Persei . . .	2.9	3	48	39.574	+3.7651	+31	37	33.85	10.855
9 H. Camelopardalis . †	5.2	3	49	42.558	5.0925	+60	51	18.09	10.775
ε Persei . . . †	3.0	3	52	0.709	4.0186	+39	45	33.88	10.595
ξ Persei . . .	4.0	3	53	18.983	3.8863	+35	32	29.67	10.508
γ Eridani . . .	3.2	3	53	58.196	+2.7984	−13	45	19.36	+10.366
λ Tauri . . . †	*var.*	3	55	51.516	3.3213	+12	14	42.92	10.323
δ Reticuli . . .	4.4	3	57	21.805	+0.9405	−61	38	43.24	+10.220

η Persei, star 8^m.5, 28″ n. pr.
ε Arietis, dup., 5^m.2, 5^m.6, 1″.2
θ Eridani, comp. 4^m.4, f. 8″
ρ Persei, var. irreg., 3^m.4–4^m.2

β Persei, var. 2^d.87, 2^m.1–3^m.2
12 Eridani, comp., 7^m, 1″.4 n. pr.
38 Horologii remarkable purplish red star.
ε Eridani, comp. 9^m, s. 7″

η Tauri, quad., comps. 6^m.3, 7^m.6, 8^m.2, 117″, 181″, 190″
9 H. Camelop., comp. 8^m, 1″.9 n. f.
ε Persei, comp. 8^m, 8″ 6 n. f.
λ Tauri, var., 3^d.95, 3^m.3–4^m.2

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Name of Star.	Magni-tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
ν Tauri	3.9	3	58	31.622	+ 3.1895	+ 5	44	55.03	+10.129
A Tauri †	4.5	3	59	32.966	3.5430	+21	50	42.00	9.999
c Persei	4.0	4	2	20.456	4.3464	+47	28	52.18	9.813
p Tauri	5.6	4	5	31.781	3.6488	+26	15	16.88	9.559
o^1 Eridani	4.1	4	7	37.080	2.9272	− 7	3	49.33	9.526
Groombridge 750	6.7	4	8	52.234	+17.5460	+85	19	32.98	+ 9.386
μ Tauri	4.3	4	10	48.522	3.2554	+ 8	40	30.76	9.169
α Horologii	3.8	4	11	7.122	1.9873	−42	30	31.44	8.939
α Reticuli	3.4	4	13	18.011	0.7646	−62	41	29.16	9.043
γ Tauri	3.9	4	14	50.431	3.4113	+15	25	5.94	8.853
δ Tauri	3.9	4	17	54.928	+ 3.4567	+17	20	21.32	+ 8.606
υ^5 Eridani	4.1	4	20	46.127	2.2528	−34	13	6.36	8.453
ε Tauri	3.6	4	23	32.083	+ 3.5005	+18	59	17.84	8.156
δ Mensæ	5.6	4	23	49.572	− 4.1531	−80	25	6.81	8.239
m Persei †	6.1	4	27	17.396	+ 4.2145	+42	52	44.47	7.894
α Tauri (*Aldebaran*)	1.1	4	30	55.598	+ 3.4398	+16	20	6.72	+ 7.407
ν Eridani	4.1	4	31	58.248	2.9956	− 3	31	46.43	7.512
α Doradus	3.5	4	32	6.930	1.2945	−55	13	28.81	7.489
53 Eridani	4.0	4	34	11.664	2.7454	−14	28	24.09	7.177
τ Tauri	4.3	4	37	1.298	3.5984	+22	47	27.06	7.081
Groombridge 848	6.0	4	37	6.285	+ 8.0161	+75	47	4.45	+ 6.950
α Cœli	4.5	4	37	45.405	1.9299	−42	1	47.00	6.933
4 Camelopardalis	5.4	4	40	45.063	4.9858	+56	36	13.81	6.646
μ Eridani	4.2	4	41	9.096	2.9987	− 3	24	48.08	6.752
π^3 Orionis	3.3	4	45	6.961	3.2550	+ 6	48	36.96	6.457
9 Camelopardalis	4.4	4	45	23.645	+ 5.9468	+66	11	46.67	+ 6.416
i Tauri	5.1	4	46	16.980	3.5074	+18	41	33.44	6.302
π^5 Orionis	3.9	4	49	43.132	3.1239	+ 2	17	56.62	6.056
ι Aurigæ	2.9	4	51	19.540	3.9036	+33	1	45.36	5.896
β Camelopardalis	4.2	4	55	40.373	5.3249	+60	18	58.98	5.541
ε Aurigæ †	*var.*	4	55	43.415	+ 4.3008	+43	41	44.02	+ 5.536
ζ Aurigæ	3.9	4	56	23.644	4.1892	+40	56	59.60	5.470
ι Tauri	4.7	4	57	53.668	3.5845	+21	27	59.21	5.317
11 Orionis	4.6	4	59	35.797	3.4265	+15	17	1.59	5.187
η Aurigæ	3.3	5	0	24.709	4.2038	+41	7	4.04	5.082
ε Leporis	3.3	5	1	46.658	+ 2.5384	−22	29	14.10	+ 4.974
β Eridani	2.9	5	3	34.351	2.9491	− 5	11	53.24	4.812
μ Aurigæ	4.8	5	7	28.334	4.1014	+38	22	56.65	4.475
19 H. Camelopardalis	5.2	5	8	11.849	9.8295	+79	8	0.75	4.648
μ Leporis	3.3	5	9	1.385	2.6939	−16	18	28.01	4.394
α Aurigæ (*Capella*)	0.2	5	10	15.591	+ 4.4284	+45	54	38.17	+ 3.888
β Orionis (*Rigel*) †	0.3	5	10	21.362	2.8822	− 8	18	5.04	4.308
λ Aurigæ	4.8	5	13	1.150	4.2174	+40	1	21.98	3.421
τ Orionis	3.7	5	13	22.901	2.9124	− 6	56	15.62	4.045
o Columbæ	4.9	5	14	20.657	2.1587	−34	58	47.79	3.615
γ Orionis (*Bellatrix*)	1.7	5	20	27.843	+ 3.2168	+ 6	16	17.91	+ 3.424
β Tauri	1.8	5	20	47.470	3.7911	+28	32	5.62	3.236
17 Camelopardalis	5.8	5	21	57.004	+ 5.6591	+62	59	45.05	+ 3.306

A Tauri, star 6m.5 f. 38s, 270″, s.
m Persei, star 6m.5, 115″, s. pr.

ε Aurigæ, var. irreg., 3m.0–4m.5.

β Orionis, comp. 8m.0, 9″.5, s. pr

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Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
β Leporis	3.0	5 24 31.059	+ 2.5702	−20 49 41.16	+3.002
χ Aurigæ	4.9	5 27 3.855	3.9038	+32 7 42.94	2.858
δ Orionis †	2.5	5 27 33.680	3.0642	− 0 21 45.96	2.825
Groombridge 966	6.4	5 28 5.029	8.0074	+74 59 17.32	2.800
α Leporis	2.7	5 28 53.574	2.6456	−17 53 2.07	2.712
φ¹ Orionis	4.5	5 30 2.608	+ 3.2925	+ 9 25 52.99	+2.597
ι Orionis †	2.9	5 31 10.622	2.9341	− 5 57 58.68	2.512
ε Orionis	1.8	5 31 47.901	3.0435	− 1 15 24.02	2.462
ζ Tauri	3.0	5 32 26.680	3.5848	+21 5 24.95	2.372
Groombridge 944	6.4	5 33 57.736	18.7532	+85 9 21.38	2.268
ζ Orionis †	2.0	5 36 22.119	+ 3.0269	− 1 59 16.63	+2.049
α Columbæ	2.8	5 36 29.919	2.1724	−34 7 12.02	2.014
ο Aurigæ	5.5	5 39 9.527	4.6450	+49 47 21.25	1.802
ζ Leporis	3.7	5 43 0.773	2.7178	−14 51 13.23	1.484
κ Orionis	2.2	5 43 37.807	2.8448	− 9 41 59.33	1.427
δ Doradus	4.5	5 44 36.904	+ 0.1020	−65 46 5.38	+1.344
ν Aurigæ	4.2	5 45 27.569	+ 4.1572	+39 7 26.60	1.284
31 Mensæ (G.)	6.2	5 47 1.50*	−11.6895	−84 49 51.91	1.220
δ Leporis	3.9	5 47 34.765	+ 2.5796	−20 53 8.83	0.437
α Orionis (*Betelgeux*) †	*var.*	5 50 27.691	3.2478	+ 7 23 29.98	0.843
δ Aurigæ	3.9	5 52 21.869	+ 4.9417	+54 16 45.53	+0.549
η Leporis	3.8	5 52 26.532	2.7322	−14 10 58.44	0.802
β Aurigæ	2.1	5 53 8.857	4.4017	+44 56 22.89	0.593
θ Aurigæ †	2.7	5 53 47.318	4.0916	+37 12 26.80	+0.452
1 Geminorum	4.3	5 58 49.915	3.6474	+23 16 7.90	−0.007
1 Puppis (G.) †	6.2	6 1 58.179	+ 1.7257	−45 2 10.00	+0.053
ν Orionis	4.4	6 2 36.305	3.4264	+14 46 46.84	−0.253
22 H. Camelopardalis	4.7	6 9 15.751	6.6187	+69 21 7.24	0.924
η Geminorum †	*var.*	6 9 37.608	3.6227	+22 31 58.39	0.858
2 Lyncis	4.4	6 11 57.010	5.2987	+59 2 37.64	1.015
ζ Canis Majoris	3.1	6 16 58.322	+ 2.3018	−30 1 27.97	−1.507
μ Geminorum	3.2	6 17 41.863	3.6307	+22 33 32.99	1.661
ψ¹ Aurigæ	5.1	6 18 12.034	4.6261	+49 20 0.45	1.594
β Canis Majoris	2.0	6 18 52.089	2.6415	−17 54 43.07	1.645
8 Monocerotis †	4.5	6 19 9.504	3.1802	+ 4 38 16.24	1.665
α Argûs (*Canopus*)	−0.9	6 22 1.238	+ 1.3319	−52 38 52.37	−1.914
10 Monocerotis	5.0	6 23 39.862	2.9641	− 4 42 27.26	2.060
ν Geminorum	4.1	6 23 47.853	3.5629	+20 16 5.17	2.094
8 Lyncis	6.0	6 29 44.636	5.4925	+61 33 32.38	2.870
23 H. Camelopardalis	5.6	6 31 24.375	10.3020	+79 39 39.53	3.371
ξ² Canis Majoris	4.5	6 31 24.623	+ 2.5157	−22 53 41.01	−2.704
51 Aurigæ	5.7	6 32 37.896	4.1598	+39 28 6.67	2.957
γ Geminorum	1.9	6 32 41.195	3.4671	+16 28 27.70	2.897
ν Argûs	3.2	6 35 6.036	1.8367	−43 7 9.24	3.077
S Monocerotis †	4.7	6 36 11.226	3.3047	+ 9 58 37.19	3.160
ε Geminorum	3.2	6 38 34.818	+ 3.6929	+25 13 5.50	−3.377
ξ Geminorum	3.4	6 40 24.423	3.3685	+12 59 24.91	3.709
ψ⁵ Aurigæ	5.3	6 40 28.302	+ 4.3300	+43 39 54.20	−3.361

δ Orionis, star 6^{m}.9, 52″.6, n.
ι Orionis, comp. 7^{m}.3, 11″.5, s.f.
ζ Orionis, comp. 4^{m}.2, 2″.4, s.f.

α Orionis, red star, var. irreg. 1^{m}.0–1^{m}.4.
θ Aurigæ, comp. 7^{m}.5, 2″.5, n. pr.
1 Puppis, star, 5^{m}.8, 150″, s. f.

η Gem., var. 231^{d}.4, 3^{m}.2–4^{m}.2, comp. 8^{m}.8, 1″.2, n. pr.
8 Monoc., star, 6^{m}.5, 13″.7, n. f.
S Monoc., comp 8^{m}.8, 2″.9, s. pr.

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Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
α Canis Majoris (*Sirius*) †	−1.6	6	41	18.860	+ 2.6435	−16	35	46.16	− 4.801
18 Monocerotis	4.7	6	43	19.451	3.1281	+ 2	30	29.37	3.783
43 Camelopardalis	5.1	6	44	19.896	6.4895	+68	59	27.66	3.841
θ Geminorum	3.6	6	47	3.413	3.9583	+34	4	1.61	4.137
α Pictoris	3.3	6	47	18.005	+ 0.6177	−61	50	52.42	3.870
ζ Mensæ	5.6	6	47	18.312	− 4.9387	−80	43	22.11	− 4.026
τ Argûs	2.8	6	47	46.631	+ 1.4884	−50	30	39.28	4.255
15 Lyncis †	4.5	6	49	44.976	5.2075	+58	32	16.99	4.447
θ Canis Majoris	4.2	6	50	8.896	2.7879	−11	55	43.78	4.359
ε Canis Majoris †	1.6	6	55	12.387	2.3574	−28	51	10.95	4.779
ζ Geminorum †	*var.*	6	58	57.005	+ 3.5607	+20	41	55.52	− 5.107
o^2 Canis Majoris	3.1	6	59	23.501	2.5048	−23	42	19.73	5.132
γ Canis Majoris	4.1	6	59	49.361	2.7148	−15	30	14.52	5.183
51 H. Cephei	5.3	7	0	7.12*	29.2898	+87	11	16.00	5.233
δ Canis Majoris	2.0	7	4	51.179	2.4381	−26	15	15.97	5.594
63 Aurigæ	5.1	7	5	40.459	+ 4.1331	+39	27	48.41	− 5.669
51 Geminorum	5.3	7	8	22.625	+ 3.4482	+16	18	26.75	5.934
γ^2 Volantis †	3.9	7	9	29.285	− 0.5005	−70	21	28.07	5.908
25 H. Camelopardalis	5.1	7	12	50.993	+12.8361	+82	34	55.51	6.312
λ Geminorum	3.6	7	13	5.670	3.4504	+16	41	53.17	6.330
π Argûs	2.7	7	14	4.205	+ 2.1189	−36	56	27.42	− 6.376
δ Geminorum †	3.5	7	14	55.739	+ 3.5866	+22	8	36.20	6.452
δ Volantis	4.0	7	16	53.036	− 0.0189	−67	47	52.92	6.606
7 Octantis (G.)	6.4	7	17	41.19*	−20.1724	−86	53	40.29	6.661
ι Geminorum	3.9	7	20	19.517	+ 3.7306	+27	58	18.72	6.970
η Canis Majoris	2.4	7	20	39.276	+ 2.3737	−29	7	57.97	− 6.903
Groombridge 1308	5.8	7	21	50.412	6.2767	+68	38	41.17	7.052
β Canis Minoris	3.1	7	22	26.027	3.2555	+ 8	27	55.37	7.103
ρ Geminorum	4.2	7	23	31.063	3.8633	+31	57	30.82	6.961
σ Argûs †	3.3	7	26	28.193	1.9018	−43	7	29.25	7.205
α^2 Geminorum (*Castor*)	2.0	7	29	3.069	+ 3.8334	+32	4	49.81	− 7.676
α^1 Geminorum	2.8	$\Delta\alpha$ − 0.272			. . .	$\Delta\delta$ − 4.12			. . .
25 Monocerotis	5.2	7	32	57.136	2.9819	− 3	54	57.37	7.888
α Can. Min. . (*Procyon*) †	0.5	7	34	44.907	3.1422	+ 5	26	54.76	9.090
24 Lyncis	5.0	7	35	39.203	5.0947	+58	54	54.27	8.182
κ Geminorum †	3.7	7	39	11.869	+ 3.6267	+24	36	26.61	− 8.468
β Geminorum (*Pollux*)	1.2	7	39	59.666	3.6760	+28	14	13.77	8.526
4 Puppis	5.1	7	41	56.508	2.7636	−14	21	6.05	8.628
ξ Argûs	3.5	7	45	38.119	2.5232	−24	38	26.88	8.916
ϕ Geminorum	5.0	7	48	10.529	3.6769	+26	59	30.75	9.140
26 Lyncis	5.7	7	48	23.008	+ 4.3820	+47	47	27.97	− 9.136
Groombridge 1374	5.6	7	49	48.314	7.2478	+74	9	6.68	9.278
χ Argûs	3.6	7	54	34.040	1.5260	−52	44	55.50	9.603
ω Cancri	5.9	7	55	40.139	3.6342	+25	37	54.27	9.697
χ Geminorum	5.0	7	58	10.678	3.6906	+28	2	20.40	9.937
27 Lyncis	4.9	8	1	55.277	+ 4.5308	+51	45	30.53	−10.171
ρ Argûs	2.9	8	3	50.318	2.5546	−24	3	10.13	10.260
3 H. Ursæ Majoris	5.5	8	4	10.194	+ 6.0144	+68	43	53.25	−10.332

15 Lyncis, dup., $4^{m}.9$, $6^{m}.2$, $0''.7$
ε Can. Maj., comp. 9^{m}, $7''.8$, s. f.
ζ Gem., var., $10^{d}.15$, $3^{m}.7$–$4^{m}.3$

γ^2 Volantis, comp. $5^{m}.8$, $12''.9$, n. pr.
δ Gem., comp. 8^{m}, $7''.0$, s. pr.

σ Argûs, star. 8^{m}, $22''.4$, n. f.
κ Gem., comp. 8^{m},5, $6''.6$, s. pr.

Positions given for Sirius and Procyon are those of the centers of gravity of the systems. Corrections given on page ix remain to be applied to reduce to the positions of the stars.

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Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
γ Argûs †	2.2	8	6	51.147	+ 1.8498	−47	4	47.56	−10.548
ζ Cancri (*mean*) †	4.7	8	7	13.463	3.4447	+17	54	39.55	10.693
Bradley 1147	5.7	8	8	38.597	7.6259	+76	1	25.95	10.678
20 Puppis	5.0	8	9	20.040	2.7580	−15	31	31.68	10.720
Groombridge 1119	7.0	8	11	46.151	61.2112	+88	53	44.41	10.883
β Cancri	3.8	8	11	47.893	+ 3.2558	+ 9	27	15.79	−10.955
31 Lyncis	4.4	8	16	53.172	4.1215	+43	28	5.23	11.373
d^1 Cancri	5.9	8	18	23.059	3.4393	+18	36	43.99	11.413
ε Argûs	1.7	8	20	43.779	1.2340	−59	13	45.38	11.542
30 Monocerotis	4.0	8	21	18.869	2.9997	− 3	37	18.95	11.611
o Ursæ Majoris	3.5	8	23	2.882	+ 5.0137	+61	0	36.13	−11.827
θ Chamæleontis	4.3	8	23	16.110	− 1.7439	−77	12	15.38	11.713
Groombridge 1450	6.0	8	27	15.899	+ 3.9098	+38	18	55.99	12.191
η Cancri	5.5	8	27	40.811	3.4746	+20	44	14.54	12.097
Groombridge 1446	6.3	8	30	3.712	6.7493	+73	56	5.86	12.325
δ Hydræ	4.2	8	33	3.107	+ 3.1783	+ 6	0	28.05	−12.428
σ Hydræ	4.5	8	34	12.691	3.1384	+ 3	38	51.25	12.506
γ Cancri	4.7	8	38	15.247	3.4772	+21	46	55.44	12.811
δ Cancri	4.2	8	39	44.601	3.4141	+18	28	28.93	13.108
α Pyxidis	3.7	8	40	5.740	2.4110	−32	52	20.14	12.881
ι Cancri †	4.2	8	41	26.184	+ 3.6383	+29	4	43.76	−13.032
ε Hydræ †	3.5	8	42	10.222	3.1799	+ 6	44	19.29	13.079
δ Argûs †	2.0	8	42	17.895	1.6518	−54	23	21.91	13.138
$σ^2$ Cancri (*mean*) †	5.5	8	48	56.418	3.6684	+30	54	34.52	13.496
ζ Hydræ	3.3	8	50	47.805	3.1746	+ 6	16	38.18	13.587
ι Ursæ Majoris	3.1	8	53	15.467	+ 4.1236	+48	23	2.27	−14.000
α Cancri	4.3	8	53	43.855	3.2848	+12	11	42.25	13.823
b^1 Carinæ †	5.1	8	54	50.627	1.4682	−58	53	36.17	13.871
κ Ursæ Majoris	3.7	8	57	41.555	4.1116	+47	30	4.74	14.098
$σ^2$ Ursæ Majoris †	4.9	9	2	45.354	5.3248	+67	29	19.21	14.410
κ Cancri	5.1	9	3	2.213	+ 3.2529	+11	1	8.00	−14.374
λ Argûs	2.2	9	4	47.725	+ 2.2061	−43	4	51.88	14.474
ζ Octantis	5.4	9	9	30.42*	− 8.0876	−85	18	58.68	14.708
θ Hydræ	3.8	9	9	50.365	+ 3.1237	+ 2	40	54.90	15.082
β Argûs	1.8	9	12	14.984	0.6707	−69	21	31.56	14.818
83 Cancri	6.6	9	14	7.717	+ 3.3539	+18	4	28.99	−15.157
ι Argûs	2.2	9	14	45.574	1.6041	−58	54	35.35	15.051
40 Lyncis	3.3	9	15	45.551	3.6640	+34	45	39.84	15.103
θ Pyxidis	4.9	9	17	38.278	2.6513	−25	35	42.38	15.254
α Hydræ	2.2	9	23	18.756	2.9487	− 8	16	51.38	15.508
h Ursæ Majoris	3.8	9	24	41.126	+ 4.7673	+63	26	34.74	−15.592
1 H. Draconis	4.6	9	24	46.516	8.8162	+81	42	44.16	15.648
d Ursæ Majoris	4.6	9	26	48.737	5.3635	+70	12	48.73	15.661
θ Ursæ Majoris	3.3	9	27	2.793	4.0315	+52	4	28.28	16.288
ξ Leonis	5.1	9	27	15.499	3.2371	+11	41	8.27	15.840
ψ Argûs †	3.6	9	27	16.244	+ 2.3592	−40	5	8.59	−15.718
10 Leonis Minoris	4.6	9	28	53.911	+ 3.6857	+36	47	4.04	15.865
ζ Chamæleontis	5.2	9	36	28.953	− 1.6453	−80	33	1.95	−16.223

γ Argûs, star 5^{m}, $42''.5$, s. pr.
ζ Cancri, triple; binary $5^{m}.6$, $6^{m}.3$, $1''$ with comp. $6^{m}.0$, $5''.4$ s. f.
ι Cancri, star $6^{m}.6$, $30''.6$, n. pr.
ε Hydræ, triple; binary $3^{m}.5$, $6^{m}.8$, $0''.2$, with comp. $7^{m}.8$, $3''.3$
δ Argûs, comp. 5^{m}, $2''$, s.
$σ^2$ Cancri, dup. $5^{m}.9$, $6^{m}.4$, $1''.4$
b^1 Carinæ, comp. $7^{m}.2$, 5^{s}, f.
$σ^2$ Urs. Maj., binary $4^{m}.9$, 8^{m}, $1''.3$
ψ Argûs, dup. $3^{m}.8$, $6^{m}.0$, $0''.8$

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Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation
		h	m	s	s	°	′	″	″
ο Leonis	3.8	9	36	30.550	+3.2052	+10	17	19.38	−16.277
θ Antliæ	5.0	9	40	19.388	2.6730	−27	22	14.61	16.408
ε Leonis	3.1	9	40	54.949	3.4113	+24	10	31.00	16.488
υ Ursæ Majoris	3.9	9	44	48.866	4.2937	+59	26	54.81	16.816
υ Argûs †	3.2	9	44	55.686	1.5009	−64	40	5.98	16.680
6 Sextantis	6.0	9	46	51.038	+3.0246	− 3	50	6.43	−16.785
μ Leonis	4.1	9	47	49.087	3.4175	+26	25	1.96	16.858
Groombridge 1586	6.0	9	50	37.874	5.4349	+73	17	37.77	16.996
19 Leonis Minoris	5.2	9	52	21.658	3.6858	+41	28	13.82	17.039
φ Argûs	3.7	9	53	48.353	2.1014	−54	9	12.68	17.103
π Leonis	4.9	9	55	37.031	+3.1724	+ 8	27	43.48	−17.192
η Leonis	3.6	10	2	35.406	3.2730	+17	11	14.47	17.476
α Leonis (*Regulus*)	1.3	10	3	44.428	3.1984	+12	23	34.10	17.523
λ Hydræ	3.8	10	6	20.805	2.9246	−11	55	25.00	17.719
q Velorum	4.1	10	11	4.835	2.5127	−41	41	26.10	17.792
32 Ursæ Majoris	5.7	10	11	43.864	+4.3956	+65	32	34.32	−17.863
ζ Leonis	3.6	10	11	51.269	3.3426	+23	51	4.61	17.864
λ Ursæ Majoris	3.5	10	11	51.373	3.6318	+43	20	57.55	17.894
γ Leonis *pr.* †	2.6	10	15	10.692	3.3119	+20	16	55.27	18.137
μ Ursæ Majoris	3.2	10	17	9.103	3.5866	+41	56	14.90	18.034
30 H. Ursæ Majoris	4.9	10	17	52.714	+4.3643	+66	0	24.67	−18.106
30 H. Camelopardalis	5.3	10	20	34.492	7.6025	+83	0	6.83	18.179
μ Hydræ	4.1	10	21	52.934	2.9004	−16	23	30.39	18.316
31 Leonis Minoris	4.4	10	22	51.461	3.4797	+37	9	11.96	18.384
α Antliæ	4.4	10	23	10.145	2.7422	−30	37	29.32	18.306
36 Ursæ Majoris	4.8	10	25	4.129	+3.8621	+56	25	37.33	−18.390
9 H. Draconis	5.0	10	27	44.011	5.1899	+76	9	41.87	18.452
ρ Leonis	3.8	10	28	13.912	3.1618	+ 9	45	16.80	18.464
33 Sextantis	6.4	10	36	58.629	3.0520	− 1	17	1.36	18.855
41 Leonis Minoris	5.0	10	38	41.307	3.2674	+23	38	39.08	18.788
θ Argûs	3.0	10	39	50.959	+2.1320	−63	56	20.26	−18.859
42 Leonis Minoris	5.4	10	41	1.843	3.3430	+31	8	26.98	18.909
η Argûs †	*var.*	10	41	40.951	2.3204	−59	13	36.99	18.896
μ Argûs †	2.8	10	43	1.464	2.5732	−48	57	37.90	19.007
l Leonis	5.3	10	44	41.160	3.1566	+11	0	20.70	19.006
δ^2 Chamæleontis †	4.6	10	44	58.640	+0.5961	−80	4	52.70	−18.985
ν Hydræ	3.3	10	45	19.858	2.9581	−15	44	16.54	18.780
46 Leonis Minoris	3.9	10	48	27.019	3.3640	+34	41	3.16	19.360
54 Leonis †	4.5	10	50	54.306	3.2534	+25	12	50.57	19.160
ι Antliæ	4.7	10	52	39.923	2.7957	−36	40	11.58	19.324
Groombridge 1706	6.3	10	53	1.693	+4.8948	+78	14	11.48	−19.231
α Crateris	4.2	10	55	32.054	2.9205	−17	50	7.65	19.150
d Leonis	5.0	10	56	4.084	3.0993	+ 4	5	5.27	19.293
β Ursæ Majoris	2.4	10	56	36.032	3.6419	+56	50	56.40	19.258
α Ursæ Majoris	2.0	10	58	22.218	+3.7302	+62	13	15.30	19.396
η Octantis	6.3	10	59	56.70*	−0.3494	−84	7	33.14	−19.366
χ Leonis	4.7	11	0	31.821	+3.0962	+ 7	48	24.05	19.415
p^4 Leonis	5.7	11	2	28.001	+3.0613	+ 2	25	41.26	−19.498

υ Argûs, comp. $6^{m}.0$, $4''.9$, s. f.
γ Leonis, comp. $3^{m}.8$, $3''.7$, s. f.
η Argûs, var., irreg., $1^{m}.6$–$6^{m}.6$
μ Argûs, comp. 7^{m}, $2''.2$, n. f.
δ^2 Cham., star $5^{m}.5$ pr. 32^{s}, $256''$, s.
54 Leonis, comp. $6^{m}.3$, $6''.4$, s. f.

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Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
ψ Ursæ Majoris	3.2	11	4	46.697	+3.3858	+44	58	14.81	−19.499
β Crateris	4.5	11	7	22.634	2.9474	−22	21	2.89	19.626
δ Leonis	2.6	11	9	29.043	3.1955	+21	0	1.82	19.702
θ Leonis	3.4	11	9	40.558	3.1507	+15	54	18.92	19.649
ν Ursæ Majoris	3.7	11	13	47.005	3.2484	+33	34	9.20	19.613
δ Crateris	3.8	11	14	59.386	+2.9973	−14	18	27.32	−19.465
σ Leonis	4.1	11	16	39.080	3.0951	+ 6	30	22.90	19.701
π Centauri	4.3	11	17	2.095	2.7255	−54	0	50.82	19.708
ι Leonis †	4.0	11	19	23.377	3.1287	+11	0	30.94	19.815
τ Leonis	5.2	11	23	27.813	3.0858	+ 3	20	7.91	19.808
λ Draconis	4.1	11	26	15.244	+3.5986	+69	48	40.95	−19.850
ξ Hydræ	3.7	11	28	43.219	2.9459	−31	22	34.36	19.914
λ Centauri	3.3	11	31	45.642	2.7492	−62	32	18.19	19.920
υ Leonis	4.5	11	32	29.655	3.0716	− 0	20	35.88	19.863
π Chamæleontis	5.7	11	33	39.922	2.4515	−75	24	53.71	19.936
3 Draconis	5.5	11	37	37.900	+3.3748	+67	13	35.26	−19.916
ζ Crateris	4.9	11	40	21.078	3.0375	−17	52	1.23	20.013
χ Ursæ Majoris	3.8	11	41	27.729	3.1808	+48	15	42.58	19.960
β Leonis (*Denebola*)	2.2	11	44	37.403	3.0626	+15	3	30.40	20.119
β Virginis	3.8	11	46	9.810	3.1252	+ 2	15	18.30	20.284
Groombridge 1830	6.5	11	47	58.139	+3.4683	+38	20	35.31	−25.801
γ Ursæ Majoris	2.5	11	49	15.673	3.1708	+54	10	42.55	20.019
π Virginis	4.6	11	56	24.883	3.0743	+ 7	5	58.02	20.075
ο Virginis	4.2	12	0	46.680	3.0571	+ 9	12	58.00	20.013
δ Centauri	2.9	12	3	50.606	3.0945	−50	14	16.90	20.073
ε Corvi	3.2	12	5	38.882	+3.0809	−22	8	9.45	−20.037
4 H. Draconis	5.1	12	8	8.259	2.8500	+78	5	58.76	20.014
δ Crucis	3.1	12	10	31.364	3.1738	−58	15	55.07	20.063
δ Ursæ Majoris	3.4	12	11	7.678	2.9857	+57	30	57.57	20.017
γ Corvi	2.8	12	11	19.778	3.0814	−17	3	31.82	20.005
2 Canum Venaticorum. †	5.8	12	11	46.291	+3.0165	+41	8	39.53	−20.065
β Chamæleontis	4.4	12	13	13.034	3.4439	−78	49	44.95	19.995
Bradley 1672	6.3	12	14	26.979	0.3471	+88	10	55.87	19.948
η Virginis	4.0	12	15	27.290	3.0693	− 0	11	0.20	20.027
α^1 Crucis	1.6	12	21	44.933	3.3107	−62	37	1.45	19.995
α^2 Crucis	2.1	$\Delta\alpha$ + 0.610			. . .	$\Delta\delta$ − 1.31			. . .
20 Comæ	5.7	12	25	21.144	+3.0184	+21	22	40.01	−19.959
δ Corvi †	3.1	12	25	21.660	3.1010	−16	1	52.20	20.072
γ Crucis †	1.6	12	26	19.814	3.3024	−56	37	33.55	20.174
8 Canum Venaticorum	4.3	12	29	36.912	2.8568	+41	49	48.21	19.599
κ Draconis	3.9	12	29	46.614	+2.5787	+70	16	3.72	−19.867
β Corvi	2.8	12	29	48.823	3.1451	−22	54	56.66	19.938
24 Comæ *seq.* †	5.2	12	30	45.989	3.0108	+18	51	20.91	19.852
α Muscæ	2.9	12	31	58.907	3.5395	−68	39	22.66	19.880
χ Virginis	4.8	12	34	45.261	3.0936	− 7	31	0.96	19.846
γ Centauri †	2.4	12	36	42.774	+3.2938	−48	28	55.85	−19.809
γ Virginis (*mean*) †	2.9	12	37	15.130	3.0397	− 0	58	20.52	19.778
ρ Virginis	5.0	12	37	28.900	+3.0373	+10	42	53.42	−19.885

ι Leonis, comp. 6^m.8, 2″.6, n. f.
2 Can. Ven., star 8^m, 11″.6, s. pr.
δ Corvi star, 8^m, 24″.4, s. pr.

γ Crucis, star, 6^m.6, 85″, n. f.
24 Comæ, star, 6^m.7, 20″.6, pr.
γ Cent., dup., 3^m.1, 3^m.1, 1″.4

γ Virginis, binary, 3^m.7, 3^m.7, 6″.2, P = 328°

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Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
76 Ursæ Majoris . .	5.9	12 37 46.126	+2.6322	+63 11 26.05	−19.792
β Crucis . . .	1.5	12 42 37.717	3.4810	−59 12 48.21	19.733
ι Octantis . . .	5.4	12 45 43.33*	5.9377	−84 39 3.86	19.624
31 Comæ . . .	5.1	12 47 27.711	2.9241	+28 0 50.08	19.642
32 H. Camelop. *seq.* . †	5.3	12 48 28.663	0.4348	+83 53 8.80	19.583
n Centauri . . .	4.3	12 48 36.810	+3.3122	−39 42 21.25	−19.632
ε Ursæ Majoris (*Alioth*)	1.7	12 50 12.343	2.6487	+56 25 54.77	19.579
δ Virginis . . .	3.7	12 51 13.225	3.0207	+ 3 52 12.21	19.607
α Canum Venat. *seq.* . †	2.9	12 51 57.614	2.8109	+38 47 16.91	19.484
δ Muscæ . . .	3.6	12 56 15.966	4.0698	−71 4 47.27	19.476
ε Virginis . . .	3.0	12 57 50.768	+2.9865	+11 25 35.54	−19.396
θ Virginis . . . †	4.4	13 5 26.622	3.1031	− 5 4 29.18	19.274
43 Comæ . . .	4.3	13 7 48.908	2.8027	+28 19 8.22	18.296
20 Canum Venaticorum .	4.7	13 13 38.665	2.6959	+41 1 49.62	19.005
γ Hydræ . . .	3.3	13 14 11.316	3.2551	−22 42 45.99	19.057
ι Centauri . . .	2.9	13 15 42.018	+3.3611	−36 15 13.18	−19.058
ζ¹ Ursæ Maj.. (*Mizar*) †	2.4	13 20 25.561	2.4225	+55 22 46.08	18.853
ζ² Ursæ Majoris . .	4.0	$\Delta\alpha$ + 0.957	. . .	$\Delta\delta$ −12.68	. . .
α Virginis . (*Spica*)	1.2	13 20 36.462	3.1568	−10 42 26.80	18.851
Groombridge 2001 .	6.1	13 23 54.818	1.5241	+72 50 34.83	18.736
70 Virginis . . .	5.2	13 24 10.491	+2.9340	+14 14 35.39	−19.293
κ Octantis . . .	5.6	13 26 38.29*	9.0487	−85 20 27.65	18.654
ζ Virginis . . .	3.4	13 30 15.517	3.0544	− 0 9 4.89	18.472
17 H. Canum Venat. .	5.0	13 30 54.845	2.6819	+37 37 40.50	18.493
ε Centauri . . .	2.6	13 34 22.008	3.7791	−53 1 28.29	18.410
m Virginis . . .	5.2	13 37 2.620	+3.1450	− 8 15 51.60	−18.243
τ Boötis . . .	4.5	13 43 7.667	2.8508	+17 53 23.87	18.024
η Ursæ Majoris (*Alkaid*)	1.9	13 44 6.869	2.3682	+49 44 49.70	18.035
89 Virginis . . .	5.1	13 45 8.470	3.2537	−17 42 4.08	18.014
ζ Centauri . . .	3.1	13 50 6.321	3.7247	−46 51 38.05	17.840
η Boötis . . .	2.8	13 50 32.541	+2.8567	+18 50 0.44	−18.122
θ Apodis . . . †	*var.*	13 56 48.740	5.7339	−76 22 38.74	17.527
τ Virginis . . .	4.3	13 57 13.063	3.0512	+ 1 57 54.58	17.509
11 Boötis . . .	6.1	13 57 13.843	2.7216	+27 48 22.91	17.475
β Centauri . . .	0.9	13 57 40.409	4.2041	−59 57 13.57	17.494
π Hydræ . . .	3.5	14 1 24.806	+3.4089	−26 15 49.42	−17.444
θ Centauri . . .	2.3	14 1 33.440	3.5190	−35 56 32.60	17.816
α Draconis . . .	3.6	14 2 2.056	1.6243	+64 47 29.04	17.259
d Boötis . . .	4.8	14 6 25.915	2.7371	+25 30 11.88	17.150
κ Virginis . . .	4.3	14 8 15.168	+3.1966	− 9 52 9.18	16.856
4 Ursæ Minoris . .	5.0	14 9 10.177	−0.2845	+77 57 22.56	−16.920
ι Virginis . . .	4.2	14 11 27.022	+3.1422	− 5 35 8.77	17.265
α Boötis .(*Arcturus*)	0.2	14 11 41.559	2.7355	+19 38 5.69	18.830
δ Octantis . . .	4.1	14 12 50.81*	9.2252	−83 16 13.94	16.785
λ Boötis . . .	4.3	14 13 4.673	2.2832	+46 29 14.69	16.609
λ Virginis . . .	4.6	14 14 23.949	+3.2405	−12 58 16.02	−16.676
2 Libræ . . .	6.3	14 18 44.583	3.2234	−11 19 1.72	16.550
θ Boötis . . .	4.1	14 22 14.156	+2.0433	+52 15 9.03	−16.713

32 H.Cam., star $5^m.8$, $21''.6$, n.pr.
α Can.Ven., star 5^m, $19''.8$, s. pr.

θ Virginis, comp. 9^m, $7''.1$, n. pr.
ζ¹ Urs. Maj., star Alcor $4^m.0$, f. $79^s.2$, $222''$ n.

θ Apodis, var. irreg. $5^m.5$–$6^m.6$

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Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
f Boötis	5.4	14	22	24.542	+ 2.7901	+19	37	3.23	−16.284
φ Virginis †	5.0	14	23	43.102	+ 3.0888	− 1	50	18.22	16.236
5 Ursæ Minoris	4.4	14	27	41.630	− 0.1651	+76	4	58.15	16.004
ρ Boötis	3.8	14	28	4.862	+ 2.5865	+30	45	10.27	15.891
γ Boötis	3.0	14	28	34.531	2.4172	+38	41	18.22	15.834
η Centauri	2.6	14	29	58.636	+ 3.7962	−41	46	34.20	−15.936
σ Boötis	4.5	14	30	53.583	2.6132	+30	7	21.50	15.731
α Centauri †	0.1	14	33	40.834	4.0532	−60	28	36.81	14.981
33 Boötis	5.4	14	35	36.032	2.2342	+44	46	46.09	15.644
α Apodis	3.8	14	36	59.789	7.2862	−78	40	35.33	15.547
μ Virginis	4.0	14	38	28.415	+ 3.1584	− 5	16	49.77	−15.764
ε Boötis †	2.7	14	41	11.253	2.6203	+27	26	25.67	15.280
109 Virginis	3.8	14	41	50.962	3.0310	+ 2	15	32.29	15.286
8 Libræ	5.3	14	45	52.308	3.3129	−15	38	9.69	15.094
α Libræ	2.9	14	46	3.753	3.3135	−15	40	50.89	15.086
Groombridge 2164	5.7	14	49	13.843	+ 1.5200	+59	38	50.03	−14.707
β Ursæ Minoris	2.2	14	50	56.879	− 0.2066	+74	30	39.70	14.721
ξ^2 Libræ	5.6	14	52	2.679	+ 3.2502	−11	3	32.91	14.659
Piazzi 221	5.8	14	52	6.774	2.8296	+14	47	50.47	14.665
β Lupi	2.8	14	52	49.527	3.9123	−42	47	3.39	14.673
δ Libræ †	*var.*	14	56	19.288	+ 3.2010	− 8	10	27.50	−14.415
β Boötis	3.6	14	58	40.142	2.2600	+40	43	59.62	14.296
γ Scorpii	3.4	14	58	58.493	3.5044	−24	56	26.08	14.285
ψ Boötis	4.7	15	0	43.053	2.5703	+27	17	10.78	14.144
c Boötis	5.0	15	3	28.787	+ 2.6347	+25	12	26.64	14.142
Groombridge 2283	7.2	15	4	59.30*	−19.6650	+87	34	6.01	−13.831
ζ Lupi	3.5	15	6	1.652	+ 4.2906	−51	46	7.22	13.863
ι Libræ	4.7	15	7	15.536	3.4138	−19	27	47.52	13.772
γ Trianguli Australis	3.1	15	10	46.150	5.5498	−68	21	33.08	13.535
3 Serpentis	5.4	15	10	51.787	2.9798	+ 5	15	42.34	13.491
δ Boötis	3.5	15	11	59.729	+ 2.4193	+33	38	19.72	−13.539
β Libræ	2.7	15	12	19.394	+ 3.2246	− 9	3	45.09	13.416
γ Ursæ Minoris	3.1	15	20	51.522	− 0.1172	+72	8	36.75	12.814
μ Boötis *pr.* †	4.5	15	21	12.230	+ 2.2663	+37	40	54.38	12.723
τ^1 Serpentis	5.5	15	21	45.203	2.7799	+15	43	59.90	12.791
ι Draconis	3.5	15	22	59.659	+ 1.3331	+59	16	13.66	−12.674
ρ Octantis	5.7	15	23	3.25*	13.3079	−84	10	40.11	12.600
ζ Libræ	5.6	15	23	20.839	3.3784	−16	24	49.92	12.703
β Coronæ Borealis	3.7	15	24	14.527	2.4738	+29	24	18.15	12.521
ν^1 Boötis	5.2	15	27	48.261	2.1551	+41	7	44.80	12.369
γ Lupi (*mean*) †	3.0	15	29	20.282	+ 3.9862	−40	52	30.87	−12.298
γ Libræ	4.0	15	30	39.447	3.3521	−14	29	59.74	12.151
α Coronæ Borealis	2.3	15	31	0.234	2.5394	+27	0	24.71	12.233
ζ Coronæ Borealis *seq.* †	5.1	15	36	6.113	2.2596	+36	55	3.86	11.787
α Serpentis	2.8	15	39	58.890	2.9529	+ 6	41	55.29	11.457
β Serpentis	3.7	15	42	10.340	+ 2.7684	+15	41	36.23	−11.397
κ Serpentis	4.3	15	44	49.366	2.6994	+18	24	34.32	11.249
μ Serpentis	3.6	15	45	4.692	+ 3.1282	− 3	9	52.77	−11.159

φ Virginis, comp. 9^m, $4''.5$ s. f.
ε Boötis, comp. $5^m.1$, $2''.8$ n. pr.

δ Libræ, var., $2^d.33$, $4^m.8$–$6^m.2$
μ Boötis, star $6^m.7$, $108''$ s.

γ Lupi, binary $3^m.7$, $3^m.9$, $0''.4$
ζ Cor. Bor., comp., $6^m.0$, $6''.2$ n. pr.

α Centauri, dup., $0^m.3$, $1^m.7$; companion s. pr. The position given is that of the center of gravity of the system. Corrections given on page ix remain to be applied to reduce to the positions of the stars.

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Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
12 H. Draconis . .	5.1	15	45	20.240	+0.9067	+62	52	5.37	−11.181
ε Serpentis . . .	3.8	15	46	28.671	+2.9882	+ 4	44	20.67	10.959
ζ Ursæ Minoris . .	4.3	15	47	8.506	−2.2076	+78	3	45.33	10.984
β Trianguli Australis .	3.0	15	47	27.977	+5.2554	−63	9	47.51	11.365
λ Libræ . . .	5.1	15	48	16.841	3.4771	−19	54	28.28	10.943
γ Serpentis . . .	3.9	15	52	26.028	+2.7696	+15	56	41.73	−11.879
π Scorpii . . .	3.0	15	53	35.147	3.6234	−25	51	51.93	10.553
ε Coronæ Borealis .	4.2	15	53	59.079	2.4822	+27	7	45.05	10.542
δ Scorpii . . .	2.5	15	55	11.162	3.5420	−22	22	29.55	10.420
θ Draconis . . .	4.1	16	0	15.491	1.1214	+58	47	50.44	9.664
β Scorpii . . . †	2.9	16	0	22.506	+3.4832	−19	34	4.95	−10.022
κ Herculis . . . †	5.3	16	4	8.817	2.7050	+17	16	40.34	9.730
φ Herculis . . .	4.3	16	6	1.705	1.8897	+45	9	45.21	9.526
Groombridge 2320 .	5.4	16	6	4.861	0.1520	+68	2	21.02	9.507
δ¹ Apodis . . .	4.8	16	7	18.308	8.8468	−78	28	42.43	9.520
δ Ophiuchi . . .	3.0	16	9	47.090	+3.1413	− 3	28	15.58	− 9.417
σ Coronæ Bor. *seq.* . †	5.8	16	11	25.205	+2.2458	+34	4	43.24	9.217
19 Ursæ Minoris . .	5.5	16	13	17.411	−1.7508	+76	5	49.07	8.992
γ² Normæ . . .	4.1	16	13	19.306	+4.4713	−49	56	35.08	9.061
ε Ophiuchi . . .	3.3	16	13	42.983	3.1717	− 4	28	52.15	8.929
σ Scorpii . . . †	3.1	16	15	53.855	+3.6413	−25	23	5.52	− 8.834
τ Herculis . . .	3.9	16	17	7.543	1.8030	+46	31	12.11	8.670
γ Herculis . . .	3.8	16	18	4.894	+2.6454	+19	21	24.19	8.587
η Ursæ Minoris . .	5.0	16	20	1.903	−1.7927	+75	57	22.43	8.217
γ Apodis . . .	3.9	16	20	4.215	+9.0960	−78	42	13.33	8.549
ω Herculis . . .	4.5	16	21	23.798	+2.7617	+14	13	58.43	− 8.420
η Draconis . . . †	2.9	16	22	48.659	0.8075	+61	42	39.21	8.190
α Scorpii . (*Antares*) †	1.2	16	24	4.226	3.6738	−26	14	23.10	8.176
β Herculis . . .	2.8	16	26	28.722	2.5774	+21	40	42.39	7.980
λ Ophiuchi . . . †	3.8	16	26	31.459	+3.0238	+ 2	10	25.03	8.030
A Draconis . . .	5.0	16	28	8.844	−0.1305	+68	57	22.98	− 7.785
τ Scorpii . . .	2.9	16	30	27.824	+3.7293	−28	2	11.01	7.669
σ Herculis . . .	4.2	16	31	17.882	1.9334	+42	36	56.94	7.540
ζ Ophiuchi . . .	2.7	16	32	21.991	3.3006	−10	23	29.88	7.457
24 Scorpii . . .	5.0	16	36	32.353	3.4664	−17	34	28.27	7.144
ζ Herculis . . . †	3.0	16	38	0.373	+2.2613	+31	45	35.38	− 6.629
α Trianguli Australis .	1.9	16	39	26.462	6.3218	−68	52	9.73	6.951
η Herculis . . .	3.6	16	39	54.761	2.0557	+39	5	13.57	6.956
Groombridge 2377 .	4.9	16	43	38.797	1.1371	+56	56	13.47	6.494
ε Scorpii . . .	2.4	16	44	31.509	3.8794	−34	8	10.77	6.746
49 Herculis . . .	6.4	16	48	7.162	+2.7301	+15	7	9.85	− 6.198
ε¹ Aræ . . .	4.2	16	52	38.664	4.7706	−53	1	40.72	5.823
κ Ophiuchi . . .	3.4	16	53	32.962	+2.8381	+ 9	30	34.34	5.742
ε Ursæ Minoris . .	4.4	16	54	50.519	−6.2642	+82	10	55.32	5.623
30 Ophiuchi . . .	5.0	16	56	28.348	+3.1628	− 4	5	34.36	5.561
ε Herculis . . .	3.9	16	56	57.627	+2.2945	+31	3	13.97	− 5.421
d Herculis . . .	5.3	16	58	23.568	2.2120	+33	41	36.79	5.333
η Ophiuchi . . . †	2.6	17	5	23.200	+3.4373	−15	37	4.72	− 4.640

β Scorpii, comp. $5^{m}.1$, 13″.3 n. f.
κ Herculis, star $6^{m}.5$, 29″.7 n. f.
σ Cor. Bor. comp. $6^{m}.7$, 4″.6 s. pr.

σ Scorpii, star 8^{m}, 20″ pr.
η Draconis, comp. 8^{m}, 5″.4 s. f.
α Scorpii, comp. 7^{m}, 3″.2 pr.

λ Ophiuchi, comp. 6^{m}, 1″.2 n. f.
ζ Herculis, binary, $3^{m}.0$, $6^{m}.0$, 1″.
η Oph., binary, $3^{m}.2$, $3^{m}.7$, 0″.5

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Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
η Scorpii	3.4	17 5 55.150	+ 4.2919	−43 7 32.22	−4.992
ζ Draconis	3.2	17 8 31.967	0.1686	+65 49 18.04	4.446
α Herculis †	*var.*	17 10 40.792	2.7344	+14 29 19.44	4.251
δ Herculis †	3.2	17 11 27.443	2.4631	+24 56 28.07	4.372
π Herculis	3.4	17 12 0.962	2.0884	+36 54 23.79	4.167
59 Apodis (G.)	5.9	17 15 10.247	+11.1578	−80 46 50.95	−3.935
θ Ophiuchi	3.4	17 16 39.893	3.6816	−24 54 48.96	3.803
w Herculis	5.4	17 17 24.194	2.2428	+32 34 44.26	4.751
β Aræ	2.8	17 18 3.901	4.9805	−55 26 55.15	3.675
b Ophiuchi	4.3	17 21 3.304	3.6607	−24 5 46.61	3.527
σ Ophiuchi	4.4	17 22 11.850	+ 2.9756	+ 4 12 54.99	−3.283
δ Aræ	3.8	17 23 14.415	5.4053	−60 36 45.83	3.321
α Aræ	3.0	17 25 6.842	4.6326	−49 48 29.77	3.123
λ Herculis	4.5	17 27 13.326	2.4240	+26 10 32.09	2.839
λ Scorpii	1.7	17 27 41.949	4.0708	−37 2 28.28	2.843
β Draconis	3.0	17 28 27.976	+ 1.3541	+52 21 55.41	−2.741
α Ophiuchi	2.1	17 30 53.722	2.7837	+12 37 21.20	2.774
ξ Serpentis	3.6	17 32 36.210	3.4328	−15 20 40.23	2.451
ι Herculis	3.8	17 37 0.552	1.6935	+46 3 7.81	2.004
η Pavonis	3.6	17 37 11.394	+ 5.8809	−64 41 0.84	2.072
ω Draconis	4.9	17 37 27.557	− 0.3544	+68 47 53.62	−1.650
β Ophiuchi	2.9	17 39 10.462	+ 2.9628	+ 4 36 10.42	1.661
ι^1 Scorpii	3.1	17 41 29.973	4.1946	−40 5 39.28	1.624
μ Herculis	3.5	17 43 3.184	+ 2.3470	+27 46 15.32	2.230
ψ Draconis †	4.9	17 43 28.955	− 1.0746	+72 11 30.54	1.711
γ Ophiuchi	3.7	17 43 31.784	+ 3.0072	+ 2 44 21.39	−1.512
89 Herculis	5.5	17 51 54.627	2.4206	+26 3 47.53	0.702
ξ Draconis	3.9	17 52 1.532	1.0380	+56 53 9.71	0.621
θ Herculis	4.0	17 53 16.149	+ 2.0570	+37 15 41.23	0.584
35 Draconis	5.0	17 53 20.560	− 2.6903	+76 58 30.10	0.339
ν Ophiuchi	3.5	17 54 14.187	+ 3.3018	− 9 45 49.47	−0.624
ξ Herculis	3.8	17 54 23.052	2.3314	+29 15 23.90	0.509
γ Draconis	2.4	17 54 35.147	1.3924	+51 29 55.33	0.498
67 Ophiuchi	3.9	17 56 17.282	3.0048	+ 2 56 5.97	0.338
θ Aræ	3.9	17 59 51.487	4.6698	−50 5 54.59	0.063
γ Sagittarii	3.1	18 0 13.074	+ 3.8519	−30 25 33.89	−0.179
δ Ursæ Minoris	4.4	18 0 19.30*	−19.4980	+86 36 51.09	+0.076
70 Ophiuchi †	4.1	18 1 3.433	+ 3.0315	+ 2 31 7.96	−1.030
72 Ophiuchi	3.7	18 3 13.475	2.8432	+ 9 33 2.91	+0.369
χ Octantis	5.2	18 3 48.95*	35.7394	−87 39 53.07	0.208
o Herculis	3.8	18 4 8.901	+ 2.3394	+28 44 59.46	+0.365
μ Sagittarii	4.0	18 8 33.595	3.5870	−21 4 56.87	0.747
η Sagittarii	3.2	18 11 44.457	4.0597	−36 47 18.68	0.874
Groombridge 2533	5.4	18 12 56.388	1.8652	+42 7 44.99	1.130
36 Draconis	5.0	18 13 23.769	0.3456	+64 22 3.52	1.196
δ Sagittarii	2.8	18 15 25.460	+ 3.8406	−29 51 57.64	+1.314
η Serpentis	3.4	18 16 48.436	3.1027	− 2 55 19.59	0.777
ε Sagittarii	2.0	18 18 23.829	+ 3.9815	−34 25 35.54	+1.485

α Herculis, var. irreg., $3^m.1$–$3^m.9$, dup. comp. 6^m, 4″.6 s. f.

δ Herculis, binary, comp. 8^m, 14″ s. pr.

ψ Draconis, star $6^m.1$, 30″.4 n. f.

70 Ophiuchi, comp. 6^m, 2″.1 s.

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Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
109 Herculis	3.9	18	19	59.417	+ 2.5559	+21	43	45.60	+1.485
α Telescopii	3.8	18	20	31.365	4.4501	−46	1	2.63	1.724
λ Sagittarii	2.9	18	22	36.101	+ 3.7027	−25	28	14.78	1.775
χ Draconis	3.7	18	22	37.666	− 1.0784	+72	41	43.00	1.603
c Serpentis	5.4	18	25	9.309	+ 3.1215	− 2	2	32.45	2.161
1 Aquilæ	4.1	18	30	28.361	+ 3.2646	− 8	18	20.46	+2.342
ζ Pavonis	4.1	18	32	52.355	7.0209	−71	30	15.08	2.701
α Lyræ (*Vega*)	0.1	18	33	59.569	2.0314	+38	42	7.61	3.243
2 Aquilæ	4.7	18	37	30.671	3.2866	− 9	8	11.73	3.260
φ Sagittarii	3.3	18	40	13.269	3.7488	−27	4	51.82	3.494
110 Herculis	4.3	18	41	55.000	+ 2.5803	+20	27	44.28	+3.304
6 Aquilæ	4.5	18	42	33.500	3.1829	− 4	50	30.32	3.678
λ Pavonis	4.4	18	44	9.523	5.5667	−62	17	18.37	3.816
β Lyræ †	*var.*	18	46	52.060	+ 2.2147	+33	15	39.82	4.066
50 Draconis	5.4	18	49	11.264	− 1.9189	+75	19	53.85	4.320
σ Sagittarii	2.1	18	49	52.234	+ 3.7202	−26	24	20.71	+4.253
ο Draconis †	4.8	18	49	55.178	0.8882	+59	16	54.32	4.355
θ Serpentis *pr.* †	4.5	18	51	53.653	2.9822	+ 4	5	22.62	4.528
R Lyræ †	*var.*	18	52	41.284	1.8260	+43	49	51.59	4.646
ε Aquilæ	4.2	18	55	40.413	2.7221	+14	56	57.74	4.741
γ Lyræ	3.3	18	55	41.324	+ 2.2434	+32	34	10.44	+4.818
ζ Sagittarii †	2.7	18	57	4.612	3.8181	−30	0	19.99	4.922
ζ Aquilæ	3.0	19	1	24.670	2.7569	+13	44	0.26	5.208
λ Aquilæ	3.6	19	1	37.916	3.1836	− 5	0	49.21	5.243
α Coronæ Australis	4.1	19	3	33.225	4.0834	−38	2	27.86	5.370
ι Lyræ	5.1	19	4	11.855	+ 2.1412	+35	57	47.40	+5.536
π Sagittarii	3.0	19	4	35.437	+ 3.5690	−21	9	45.81	5.539
λ Ursæ Minoris	6.6	19	7	25.98*	−71.1246	+89	0	39.69	5.820
ψ Sagittarii	4.9	19	10	12.408	+ 3.6803	−25	24	27.04	6.010
δ Draconis	3.2	19	12	32.325	0.0228	+67	30	30.54	6.327
d Sagittarii	5.0	19	12	32.714	+ 3.5111	−19	6	30.81	+6.223
θ Lyræ	4.5	19	13	20.864	2.0808	+37	58	41.91	6.313
ω Aquilæ	5.1	19	13	43.972	2.8159	+11	26	16.05	6.353
κ Cygni	4.0	19	15	5.579	+ 1.3879	+53	12	27.20	6.573
τ Draconis	4.6	19	17	14.079	− 1.1344	+73	11	39.43	6.738
δ Aquilæ	3.4	19	21	6.719	+ 3.0250	+ 2	56	26.06	+7.029
σ Octantis	5.5	19	21	19.15*	96.7422	−89	13	57.47	6.963
β Cygni †	3.2	19	27	12.750	2.4189	+27	46	34.64	7.435
ι Cygni	3.9	19	27	30.783	1.5133	+51	32	38.51	7.598
μ Aquilæ	4.6	19	29	50.389	2.9312	+ 7	11	37.02	7.512
h Sagittarii	4.7	19	31	24.847	+ 3.6532	−25	4	35.26	+7.760
κ Aquilæ	5.0	19	32	12.723	3.2289	− 7	13	17.58	7.851
θ Cygni	4.6	19	34	6.528	1.6090	+50	1	9.03	8.252
54 Sagittarii	5.4	19	35	44.412	3.4389	−16	29	36.69	8.086
β Sagittæ	4.4	19	37	8.468	2.6939	+17	16	25.79	8.213
15 Cygni	5.0	19	41	8.377	+ 2.1640	+37	8	37.57	+8.602
f Sagittarii	5.1	19	41	17.289	3.5017	−19	58	15.54	8.485
γ Aquilæ	2.8	19	42	7.410	+ 2.8520	+10	24	1.91	+8.636

β Lyræ, var., $12^{d}.9$, $3^{m}.4$–$4^{m}.1$, star 7^{m}, 46″ s. f.
ο Draco., star $7^{m}.6$, 32″.1 n. pr.

θ Serpentis, star $5^{m}.4$, 22″.2 s. f.
R Lyræ, var., $46^{d}.4$, $4^{m}.0$–$4^{m}.7$

ζ Sag., binary $3^{m}.4$, $3^{m}.6$, 0″.5
β Cygni, star $5^{m}.4$, 34″.7 n. f.

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Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
δ Cygni . . . †	3.0	19 42 15.393	+1.8760	+44 55 4.44	+ 8.694
δ Sagittæ . . .	3.8	19 43 30.515	2.6749	+18 19 8.53	8.766
α Aquilæ . (*Altair*)	0.9	19 46 32.315	2.9271	+ 8 38 16.10	9.365
η Aquilæ . . . †	*var.*	19 48 2.492	+3.0568	+ 0 46 53.93	9.096
ε Draconis . . †	4.0	19 48 28.501	−0.1867	+70 2 46.74	9.165
ι Sagittarii . .	4.2	19 49 15.639	+4.1437	−42 5 51.71	+ 9.243
ε Pavonis . . .	4.1	19 50 32.758	6.9906	−73 8 28.45	9.179
β Aquilæ . . .	3.9	19 51 2.388	2.9468	+ 6 11 19.63	8.856
γ Sagittæ . . .	3.7	19 54 53.262	2.6673	+19 15 18.79	9.658
c Sagittarii . .	4.6	19 57 18.635	3.6932	−27 57 9.01	9.832
τ Aquilæ . . .	5.6	19 59 53.412	+2.9308	+ 7 1 55.16	+10.044
θ Aquilæ . . .	3.4	20 6 48.987	3.0961	− 1 4 48.67	10.540
o Cygni *seq.* . . †	4.0	20 10 53.571	+1.8901	+46 28 37.33	10.841
κ Cephei . . . †	4.4	20 11 50.392	−1.9619	+77 26 59.47	10.931
24 Vulpeculæ . .	5.4	20 13 3.739	+2.5673	+24 24 9.05	10.984
α² Capricorni . . †	3.8	20 13 13.724	+3.3306	−12 48 54.64	+11.015
β Capricorni . . †	3.2	20 16 7.506	3.3736	−15 3 24.43	11.225
α Pavonis . . .	2.1	20 18 46.281	4.7655	−57 0 53.18	11.317
γ Cygni . . .	2.3	20 19 6.337	2.1526	+39 58 39.71	11.434
π Capricorni . . †	5.2	20 22 20.569	3.4365	−18 29 50.97	11.663
ρ Capricorni . . †	5.0	20 23 53.992	+3.4248	−18 6 7.07	+11.755
41 Cygni . . .	4.1	20 25 50.492	2.4515	+30 4 39.82	11.911
θ Cephei . . .	4.3	20 28 7.469	1.0120	+62 42 5.02	12.055
ε Delphini . . .	4.0	20 29 3.411	+2.8664	+11 0 24.93	12.113
Groombridge 3241 .	6.4	20 30 23.478	−0.2373	+72 14 13.15	12.212
α Indi . . .	3.2	20 31 27.041	+4.2306	−47 35 44.70	+12.357
β Delphini . . †	3.7	20 33 28.198	2.8138	+14 17 30.79	12.407
υ Capricorni . .	5.3	20 35 5.933	3.4183	−18 26 43.67	12.547
α Delphini . . .	3.9	20 35 35.841	2.7868	+15 36 17.17	12.605
β Pavonis . . .	3.6	20 37 7.908	5.4455	−66 31 0.70	12.689
α Cygni . (*Deneb*)	1.3	20 38 27.940	+2.0447	+44 58 8.26	+12.780
δ Delphini . . .	4.5	20 39 23.841	2.8008	+14 45 42.38	12.795
ψ Capricorni . .	4.3	20 40 56.825	3.5570	−25 35 2.42	12.801
γ Delphini *seq.* . . †	4.5	20 42 37.315	2.7831	+15 48 36.71	12.864
ε Cygni . . .	2.6	20 42 41.459	2.4274	+33 38 37.90	13.391
ε Aquarii . . .	3.8	20 42 58.057	+3.2494	− 9 48 53.41	+13.053
η Cephei . . .	3.6	20 43 31.328	1.2248	+61 30 2.26	13.939
μ Aquarii . . .	4.8	20 47 57.755	3.2379	− 9 18 37.69	13.372
β Indi . . .	3.7	20 48 1.131	+4.7130	−58 46 58.65	13.406
76 Draconis . .	5.7	20 48 57.123	−4.1464	+82 12 35.90	13.500
32 Vulpeculæ . .	5.2	20 50 51.112	+2.5562	+27 43 34.48	+13.602
220 Draconis (Heis) .	5.6	20 51 34.234	−2.6219	+80 13 35.89	13.618
ν Cygni . . .	4.0	20 53 55.747	+2.2355	+40 49 54.05	13.776
α Octantis . . .	5.2	20 54 12.887	7.3894	−77 21 25.20	13.423
γ Microscopii . .	4.7	20 55 57.513	3.6870	−32 35 54.26	13.918
θ Capricorni . .	4.2	21 1 3.500	+3.3756	−17 34 45.26	+14.173
ξ Cygni . . .	3.9	21 1 45.949	2.1812	+43 34 49.49	14.292
61 Cygni *pr.* . .	5.6	21 2 59.725	+2.6852	+38 19 15.68	+17.606

δ Cygni, comp. 8^m, 1″.6 n. pr.
η Aquilæ, var., $7^d.18$, $3^m.7$–$4^m.4$
ε Draconis, comp., $7^m.6$, 3″.1 n.
o Cygni, star $5^m.0$ pr. 19^s, 270″ n., star $7^m.8$ f. 1′, 96″ s.

κ Cephei, comp. 8^m, 7″.5 s. f.
α² Capricor., α¹ Capricor., $4^m.6$ pr. 24^s, 137″ n.
β Capricor., star $6^m.2$ pr. 14^s, 10″ s.

π Capricor., comp. 9^m, 3″.4, s. f.
ρ Capricor., comp. $7^m.6$, 2″.8 s.
β Delphini, binary $4^m.1$, $5^m.4$, 0″.5
γ Delphini, comp. $5^m.5$, 11″.2 pr.

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Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
61 Cygni *seq.*	6.3	$\Delta\alpha$		+1.552	. . .	$\Delta\delta$		−15.85	. . .
ν Aquarii	4.5	21	4	51.367	+3.2702	−11	43	27.91	+14.466
Bradley 2777	5.9	21	7	15.766	−1.1379	+77	46	25.54	14.646
3 Piscis Australis	5.6	21	8	7.953	+3.5638	−27	58	29.12	14.562
ζ Cygni	3.4	21	9	13.967	2.5520	+29	52	10.32	14.673
τ Cygni †	3.8	21	11	19.060	+2.3939	+37	40	24.93	+15.290
α Equulei	4.1	21	11	28.509	2.9993	+ 4	53	15.46	14.781
σ Cygni	4.3	21	13	59.882	2.3547	+39	1	47.04	15.016
θ^1 Microscopii	4.9	21	15	11.909	3.8454	−41	10	40.42	15.088
α Cephei	2.6	21	16	30.283	1.4351	+62	13	0.09	15.207
ι Capricorni	4.3	21	17	24.275	+3.3444	−17	12	20.19	+15.212
1 Pegasi	4.2	21	18	3.768	2.7740	+19	25	54.44	15.310
γ Pavonis	4.3	21	19	15.867	5.0033	−65	45	38.69	16.099
ζ Capricorni	3.9	21	21	42.171	3.4306	−22	47	19.31	15.471
g Cygni †	5.3	21	26	14.290	2.2125	+46	9	23.89	15.806
β Aquarii	3.1	21	26	58.803	+3.1600	− 5	57	16.06	+15.731
β Cephei †	3.3	21	27	32.588	0.7867	+70	10	43.11	15.777
ξ Aquarii	4.8	21	33	7.307	3.1958	− 8	14	41.49	16.045
74 Cygni	5.1	21	33	27.678	2.4032	+40	1	20.11	16.095
γ Capricorni	3.8	21	35	16.367	3.3275	−17	3	20.57	16.162
λ Octantis †	5.4	21	37	41.405	+9.5556	−83	7	12.22	+16.291
ε Pegasi	2.5	21	39	54.768	2.9461	+ 9	28	32.30	16.416
11 Cephei	4.8	21	40	39.063	0.8888	+70	54	38.31	16.546
δ Capricorni	3.0	21	42	14.441	3.3144	−16	31	21.23	16.235
π^2 Cygni	4.3	21	43	34.681	2.2143	+48	54	24.03	16.597
μ Capricorni	5.2	21	48	33.249	+3.2733	−13	57	42.80	+16.839
γ Gruis	3.2	21	48	39.850	3.6418	−37	46	28.49	16.823
16 Pegasi	5.0	21	49	6.168	2.7283	+25	30	55.71	16.870
79 Draconis	6.6	21	51	46.372	0.7198	+73	17	25.97	17.005
ε Indi	4.7	21	56	42.665	4.6112	−57	8	38.19	14.640
20 Pegasi	5.7	21	56	51.027	+2.9222	+12	42	9.86	+17.167
α Aquarii	3.2	22	1	18.967	3.0821	− 0	44	34.29	17.415
ι Aquarii	4.4	22	1	44.392	3.2428	−14	17	31.91	17.374
20 Cephei	5.4	22	2	21.830	1.8226	+62	21	39.12	17.514
α Gruis	2.2	22	2	45.301	3.7946	−47	22	58.67	17.305
ι Pegasi	4.0	22	2	57.611	+2.7913	+24	55	11.15	+17.509
θ Pegasi	3.7	22	5	48.698	3.0267	+ 5	46	10.25	17.644
π Pegasi	4.4	22	6	7.346	2.6625	+32	45	3.43	17.603
ζ Cephei	3.6	22	7	50.053	2.0778	+57	46	19.83	17.703
24 Cephei	5.0	22	8	8.254	1.1582	+71	54	44.78	17.708
θ Aquarii	4.3	22	12	14.626	+3.1674	− 8	13	0.55	+17.852
α Tucanæ	2.9	22	12	32.956	4.1365	−60	41	36.46	17.848
υ Octantis	5.7	22	15	19.18*	12.4294	−86	24	39.46	18.065
γ Aquarii	4.0	22	17	9.789	3.0992	− 1	49	33.54	18.077
31 Pegasi	4.9	22	17	14.148	2.9529	+11	45	59.21	18.071
3 Lacertæ	4.6	22	20	8.213	+2.3553	+51	47	34.42	+17.984
π Aquarii	4.6	22	20	50.036	3.0638	+ 0	56	7.89	18.197
σ Aquarii	4.9	22	26	2.682	+3.1773	−11	7	24.32	+18.359

τ Cygni, comp. 7$^{\mathrm{m}}$, 0″.8 pr.
g Cygni, star 6$^{\mathrm{m}}$.7 f. 10$^{\mathrm{s}}$, 420″ s.

β Cephei, star 8$^{\mathrm{m}}$, 13″.3 s. pr.

λ Octantis, binary 5$^{\mathrm{m}}$.5, 8$^{\mathrm{m}}$.0, 3″.2 n. f.

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Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
α Lacertæ . . .	3.8	22 27 42.328	+2.4677	+49 50 5.60	+18.456
υ Aquarii . . .	5.3	22 29 56.159	3.2854	−21 9 15.56	18.363
226 B. Cephei . .	5.7	22 30 44.973	1.0655	+75 46 40.83	18.545
η Aquarii . . .	4.1	22 30 53.171	3.0833	− 0 33 58.29	18.496
10 Lacertæ . . .	4.9	22 35 21.347	2.6886	+38 35 49.70	18.683
ε Piscis Australis .	4.2	22 35 50.755	+3.3231	−27 29 52.31	+18.698
ζ Pegasi . . .	3.6	22 37 7.360	2.9914	+10 22 36.72	18.735
β Octantis . . .	4.3	22 37 13.726	6.3348	−81 50 17.38	18.754
β Gruis . . .	2.2	22 37 28.656	3.5969	−47 20 23.92	18.734
η Pegasi . . .	3.1	22 38 55.329	2.8090	+29 45 56.98	18.767
λ Pegasi . . .	4.1	22 42 20.335	+2.8868	+23 6 27.18	+18.897
ε Gruis . . .	3.7	22 43 18.282	3.6391	−51 46 28.29	18.875
τ Aquarii . . .	4.2	22 44 59.240	3.1793	−14 3 7.23	18.949
μ Pegasi . . .	3.7	22 45 48.176	2.8930	+24 8 30.97	18.963
ι Cephei . . .	3.7	22 46 34.797	2.1276	+65 44 33.37	18.900
λ Aquarii . . .	3.8	22 48 4.589	+3.1311	− 8 2 34.12	+19.102
ρ Indi . . .	6.1	22 48 37.089	4.2183	−70 32 19.58	19.135
δ Aquarii . . .	3.5	22 50 2.062	3.1865	−16 17 1.49	19.093
α Pisc.Aust.(*Fomalhaut*)	1.3	22 52 50.766	3.3214	−30 5 1.07	19.020
ο Andromedæ . .	3.6	22 57 54.897	2.7542	+41 51 29.47	19.305
β Pegasi . . . †	*var.*	22 59 33.287	+2.9050	+27 36 38.27	+19.488
α Pegasi . (*Markab*)	2.6	23 0 25.557	2.9862	+14 44 13.07	19.333
55 Pegasi . . .	4.7	23 2 37.259	3.0208	+ 8 56 21.32	19.408
c^2 Aquarii . . .	3.8	23 4 48.568	3.2023	−21 38 41.69	19.508
π Cephei . . . †	4.6	23 5 7.637	1.8989	+74 55 1.30	19.441
ι Gruis . . .	4.1	23 5 26.294	+3.4079	−45 43 5.50	+19.449
59 Pegasi . . .	5.2	23 7 20.609	3.0277	+ 8 14 51.07	19.523
5 Cassiopeiæ (Heis) .	5.6	23 9 5.382	2.8780	+56 41 16.57	19.851
φ Aquarii . . .	4.4	23 9 49.021	3.1073	− 6 31 5.56	19.373
ψ Aquarii . . . †	4.5	23 11 20.087	3.1450	− 9 33 42.35	19.590
γ Tucanæ . . .	4.1	23 12 21.473	+3.5208	−58 42 47.47	+19.674
γ Piscium . . .	3.8	23 12 39.294	3.1094	+ 2 48 24.38	19.640
γ Sculptoris . .	4.5	23 14 7.705	3.2453	−33 0 22.21	19.580
ο Cephei . . . †	4.9	23 15 2.863	2.4509	+67 38 7.35	19.679
τ Pegasi . . .	4.6	23 16 19.722	2.9655	+23 15 50.17	19.671
b^1 Aquarii . . .	4.2	23 18 24.149	+3.1533	−20 34 32.58	+19.627
4 Cassiopeiæ . .	5.2	23 20 57.991	2.6496	+61 48 18.21	19.746
υ Pegasi . . .	4.6	23 21 2.105	2.9903	+22 55 29.78	19.787
κ Piscium . . .	4.9	23 22 28.358	3.0752	+ 0 46 45.32	19.685
θ Piscium . . .	4.4	23 23 33.250	3.0419	+ 5 54 3.73	19.752
70 Pegasi . . .	4.7	23 24 45.210	+3.0320	+12 16 49.72	+19.845
39 H. Cephei . .	5.6	23 27 45.157	−0.2454	+86 49 39.43	19.868
β Sculptoris . .	4.5	23 28 18.557	+3.2252	−38 17 58.85	19.860
72 Pegasi (*mean*). . †	5.2	23 29 38.045	2.9706	+30 50 42.42	19.861
λ Andromedæ . .	4.0	23 33 18.116	2.9276	+45 59 12.25	19.490
ι Andromedæ . .	4.3	23 33 51.928	+2.9343	+42 47 10.90	+19.915
ι Piscium . . .	4.3	23 35 28.488	3.0843	+ 5 9 16.79	19.495
γ Cephei . . .	3.4	23 35 46.103	+2.4372	+77 8 48.46	+20.091

β Pegasi, var. irreg., $2^{m}.2$–$2^{m}.7$
π Cephei, comp. 7^{m}, 0″.9 n. f.

ψ Aquarii, star $8^{m}.5$, 49″.4 n.pr.
ο Cephei, comp. 8^{m}, 2″.9 s. pr.

72 Pegasi, $6^{m}.0$, $6^{m}.0$, 0″.4

Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
κ Andromedæ	4.3	23 36 7.144	+2.9469	+43 51 7.48	+19.913
ω^2 Aquarii	4.6	23 38 12.692	3.1129	−15 1 33.33	19.893
ι^1 Aquarii	5.3	23 39 41.439	3.1146	−18 45 35.77	19.961
ψ Andromedæ	5.1	23 41 43.112	2.9631	+45 56 13.69	19.974
41 H. Cephei	5.0	23 43 44.573	2.8483	+67 19 23.95	19.986
δ Sculptoris	4.6	23 44 23.729	+3.1281	−28 36 42.35	+19.866
γ^1 Octantis	5.1	23 47 1.961	3.6221	−82 30 8.43	20.002
φ Pegasi	5.2	23 48 3.588	3.0479	+18 38 13.48	19.979
ρ Cassiopeiæ	4.8	23 50 1.785	2.9808	+57 0 55.37	20.028
Groombridge 4163	6.6	23 50 34.945	2.8781	+73 55 34.13	20.024
ω Piscium	4.0	23 54 50.579	+3.0794	+ 6 22 54.19	+19.933
ε Tucanæ	4.7	23 55 24.185	3.1405	−66 3 39.16	20.034
30 Piscium	4.7	23 57 29.905	3.0772	− 6 29 51.23	20.007
2 Ceti	4.6	23 59 17.038	+3.0754	−17 49 13.35	+20.033

NORTHERN CIRCUMPOLARS.

Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
43 H. Cephei	4.5	0 56 38.823	+ 7.5880	+85 47 27.59	+19.432
α Ursæ Minoris (*Polaris*)	2.1	1 28 19.01*	28.0572	+88 50 29.36	18.578
Groombridge 750	6.7	4 8 52.234	17.5460	+85 19 32.98	9.386
Groombridge 944	6.4	5 33 57.736	18.7532	+85 9 21.38	+ 2.268
51 H. Cephei	5.3	7 0 7.12*	29.2898	+87 11 16.00	− 5.233
Groombridge 1119	7.0	8 11 46.151	+61.2112	+88 53 44.41	−10.883
1 H. Draconis	4.6	9 24 46.516	8.8162	+81 42 44.16	15.648
30 H. Camelop.	5.3	10 20 34.492	7.6025	+83 0 6.83	18.179
Bradley 1672	6.3	12 14 26.979	+ 0.3471	+88 10 55.87	19.948
Groombridge 2283	7.2	15 4 59.30*	−19.6650	+87 34 6.01	13.831
ε Ursæ Minoris	4.4	16 54 50.519	− 6.2642	+82 10 55.32	− 5.623
δ Ursæ Minoris	4.4	18 0 19.30*	19.4980	+86 36 51.09	+ 0.076
λ Ursæ Minoris	6.6	19 7 25.98*	71.1246	+89 0 39.69	5.820
76 Draconis	5.7	20 48 57.123	4.1464	+82 12 35.90	13.500
39 H. Cephei	5.6	23 27 45.157	− 0.2454	+86 49 39.43	+19.868

SOUTHERN CIRCUMPOLARS.

Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
4 Octantis (G.)	5.6	1 42 17.46*	− 3.8020	−85 12 33.92	+18.110
31 Mensæ (G.)	6.2	5 47 1.50*	11.6895	−84 49 51.91	+ 1.220
7 Octantis (G.)	6.4	7 17 41.19*	20.1724	−86 53 40.29	− 6.661
ζ Octantis	5.4	9 9 30.42*	8.0876	−85 18 58.68	14.708
η Octantis	6.3	10 59 56.70*	− 0.3494	−84 7 33.14	19.366
ι Octantis	5.4	12 45 43.33*	+ 5.9377	−84 39 3.86	−19.624
δ Octantis	4.1	14 12 50.81*	9.2252	−83 16 13.94	−16.785
χ Octantis	5.2	18 3 48.95*	35.7394	−87 39 53.07	+ 0.208
σ Octantis	5.5	19 21 19.15*	96.7422	−89 13 57.47	6.963
υ Octantis	5.7	22 15 19.18*	+12.4294	−86 24 39.46	+18.065

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			**α Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Jan.	0 56	+85 47	Jan.	1 27	+88 50	Jan.	4 8	+85 19	Jan.	5 34	+85 9	Jan.	7 0	+87 11
	s	″		s	″		s	″		s	″		s	″
0.3	32.61	49.14	0.3	66.65	51.79	0.4	61.65	52.38	0.5	11.78	35.27	0.5	36.66	22.42
1.3	32.36	49.19	1.3	65.75	51.88	1.4	61.55	52.62	1.5	11.75	35.54	1.5	36.76	22.69
2.3	32.11	49.25	2.3	64.87	51.97	2.4	61.46	52.87	2.4	11.74	35.80	2.5	36.88	22.96
3.3	31.87	49.32	3.3	64.00	52.07	3.4	61.37	53.13	3.4	11.74	36.08	3.5	37.02	23.23
4.3	31.61	49.41	4.3	63.11	52.20	4.4	61.28	53.40	4.4	11.75	36.38	4.5	37.17	23.52
5.2	31.35	49.50	5.3	62.17	52.34	5.4	61.18	53.68	5.4	11.75	36.70	5.5	37.32	23.82
6.2	31.07	49.59	6.3	61.17	52.48	6.4	61.07	53.98	6.4	11.75	37.03	6.5	37.47	24.14
7.2	30.77	49.66	7.3	60.09	52.61	7.4	60.95	54.28	7.4	11.73	37.37	7.5	37.60	24.48
8.2	30.46	49.72	8.3	58.96	52.73	8.4	60.80	54.58	8.4	11.69	37.72	8.5	37.71	24.84
9.2	30.14	49.77	9.3	57.79	52.83	9.4	60.64	54.88	9.4	11.63	38.07	9.5	37.80	25.20
10.2	29.81	49.78	10.3	56.59	52.90	10.4	60.46	55.16	10.4	11.55	38.42	10.5	37.86	25.56
11.2	29.49	49.78	11.3	55.41	52.95	11.4	60.28	55.43	11.4	11.47	38.75	11.5	37.88	25.92
12.2	29.17	49.76	12.3	54.24	52.99	12.4	60.08	55.67	12.4	11.37	39.06	12.5	37.88	26.27
13.2	28.88	49.72	13.2	53.13	53.00	13.4	59.89	55.89	13.4	11.27	39.36	13.5	37.86	26.59
14.2	28.60	49.68	14.2	52.07	53.01	14.4	59.71	56.09	14.4	11.17	39.63	14.5	37.83	26.90
15.2	28.32	49.63	15.2	51.06	53.02	15.4	59.53	56.29	15.4	11.07	39.88	15.5	37.80	27.19
16.2	28.08	49.59	16.2	50.12	53.03	16.4	59.38	56.47	16.4	10.99	40.12	16.5	37.78	27.47
17.2	27.84	49.56	17.2	49.20	53.05	17.3	59.23	56.65	17.4	10.91	40.36	17.5	37.78	27.74
18.2	27.60	49.55	18.2	48.29	53.08	18.3	59.08	56.85	18.4	10.85	40.62	18.5	37.80	28.02
19.2	27.35	49.56	19.2	47.35	53.14	19.3	58.94	57.07	19.4	10.79	40.89	19.5	37.85	28.31
20.2	27.07	49.57	20.2	46.34	53.20	20.3	58.79	57.31	20.4	10.72	41.18	20.5	37.90	28.61
21.2	26.77	49.58	21.2	45.25	53.25	21.3	58.63	57.55	21.4	10.65	41.50	21.5	37.94	28.95
22.2	26.46	49.57	22.2	44.09	53.30	22.3	58.44	57.81	22.4	10.55	41.81	22.5	37.96	29.30
23.2	26.13	49.52	23.2	42.89	53.31	23.3	58.23	58.05	23.4	10.43	42.14	23.5	37.93	29.66
24.2	25.80	49.47	24.2	41.66	53.30	24.3	58.00	58.28	24.4	10.29	42.46	24.4	37.86	30.03
25.2	25.50	49.38	25.2	40.47	53.27	25.3	57.77	58.48	25.4	10.13	42.74	25.4	37.75	30.38
26.2	25.20	49.26	26.2	39.34	53.20	26.3	57.53	58.64	26.4	9.97	43.00	26.4	37.61	30.70
27.2	24.93	49.13	27.2	38.28	53.13	27.3	57.29	58.78	27.4	9.81	43.23	27.4	37.46	30.99
28.2	24.69	49.01	28.2	37.31	53.05	28.3	57.08	58.90	28.4	9.66	43.45	28.4	37.31	31.27
29.2	24.46	48.89	29.2	36.40	52.97	29.3	56.88	59.01	29.4	9.52	43.65	29.4	37.18	31.52
30.2	24.23	48.78	30.2	35.52	52.90	30.3	56.68	59.13	30.4	9.38	43.84	30.4	37.07	31.77
31.2	24.00	48.68	31.2	34.63	52.85	31.3	56.49	59.25	31.4	9.26	44.04	31.4	36.98	32.03
32.2	23.75	48.60	32.2	33.70	52.80	32.3	56.31	59.40	32.4	9.14	44.26	32.4	36.89	32.31
	13.64	+13.61		49.74	+49.73		12.29	+12.25		11.85	+11.81		20.41	+20.38
	$0^h\ 56^m$	$38^s.823$		$1^h\ 28^m$	$19^s.01$		$4^h\ 8^m$	$52^s.234$		$5^h\ 33^m$	$57^s.736$		$7^h\ 0^m$	$7^s.12$
	+85° 47′	27″.59		+88° 50′	29″.36		+85° 19′	32″.98		+85° 9′	21″.38		+87° 11′	16″.00

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

48 H. Cephei. Mag. 4.5			*α* **Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Feb.	0 56	+85 47	Feb.	1 27	+88 50	Feb.	4 8	+85 19	Feb.	5 34	+85 9	Feb.	7 0	+87 11
	s	″		s	″		s	″		s	″		s	″
1.2	23.75	48.60	1.2	33.70	52.80	1.3	56.31	59.40	1.4	9.14	44.26	1.4	36.89	32.31
2.2	23.50	48.52	2.2	32.71	52.77	2.3	56.12	59.56	2.4	9.01	44.50	2.4	36.80	32.60
3.2	23.23	48.42	3.2	31.68	52.72	3.3	55.90	59.71	3.4	8.87	44.75	3.4	36.69	32.91
4.2	22.95	48.32	4.2	30.59	52.66	4.3	55.67	59.88	4.4	8.70	45.00	4.4	36.56	33.23
5.2	22.66	48.20	5.2	29.47	52.59	5.3	55.42	60.04	5.4	8.53	45.26	5.4	36.41	33.56
6.2	22.37	48.05	6.2	28.33	52.49	6.3	55.17	60.18	6.4	8.34	45.51	6.4	36.23	33.88
7.2	22.08	47.89	7.2	27.20	52.37	7.3	54.91	60.31	7.3	8.14	45.76	7.4	36.03	34.20
8.2	21.81	47.70	8.2	26.10	52.24	8.3	54.64	60.41	8.3	7.93	45.98	8.4	35.79	34.51
9.2	21.55	47.50	9.2	25.04	52.08	9.3	54.36	60.48	9.3	7.70	46.17	9.4	35.53	34.80
10.1	21.32	47.29	10.2	24.05	51.92	10.3	54.09	60.55	10.3	7.48	46.34	10.4	35.27	35.06
11.1	21.09	47.07	11.2	23.13	51.75	11.3	53.84	60.58	11.3	7.26	46.50	11.4	35.00	35.31
12.1	20.90	46.86	12.2	22.28	51.58	12.3	53.60	60.61	12.3	7.06	46.64	12.4	34.74	35.53
13.1	20.71	46.67	13.2	21.48	51.42	13.3	53.37	60.64	13.3	6.87	46.77	13.4	34.50	35.75
14.1	20.52	46.49	14.2	20.72	51.27	14.3	53.15	60.68	14.3	6.69	46.90	14.4	34.29	35.96
15.1	20.33	46.33	15.2	19.94	51.14	15.3	52.94	60.74	15.3	6.52	47.04	15.4	34.10	36.17
16.1	20.13	46.17	16.2	19.12	51.02	16.3	52.73	60.81	16.3	6.36	47.21	16.4	33.91	36.41
17.1	19.91	46.02	17.2	18.24	50.92	17.3	52.51	60.89	17.3	6.19	47.39	17.4	33.74	36.67
18.1	19.66	45.86	18.1	17.29	50.80	18.3	52.27	60.99	18.3	6.01	47.59	18.4	33.54	36.94
19.1	19.41	45.68	19.1	16.29	50.66	19.3	52.02	61.09	19.3	5.81	47.78	19.4	33.30	37.22
20.1	19.16	45.47	20.1	15.27	50.50	20.3	51.75	61.15	20.3	5.59	47.97	20.4	33.03	37.50
21.1	18.92	45.24	21.1	14.27	50.31	21.3	51.47	61.20	21.3	5.35	48.13	21.4	32.72	37.78
22.1	18.69	44.98	22.1	13.34	50.09	22.3	51.19	61.20	22.3	5.10	48.28	22.4	32.39	38.03
23.1	18.50	44.71	23.1	12.49	49.85	23.2	50.91	61.19	23.3	4.85	48.38	23.4	32.03	38.25
24.1	18.34	44.44	24.1	11.74	49.60	24.2	50.65	61.14	24.3	4.60	48.46	24.4	31.68	38.44
25.1	18.18	44.18	25.1	11.07	49.37	25.2	50.41	61.08	25.3	4.38	48.52	25.4	31.33	38.61
26.1	18.04	43.93	26.1	10.45	49.14	26.2	50.18	61.03	26.3	4.16	48.57	26.4	31.01	38.78
27.1	17.90	43.69	27.1	9.85	48.94	27.2	49.96	60.98	27.3	3.95	48.63	27.4	30.72	38.93
28.1	17.76	43.47	28.1	9.24	48.74	28.2	49.74	60.96	28.3	3.74	48.70	28.4	30.43	39.09
29.1	17.62	43.25	29.1	8.58	48.55	29.2	49.52	60.94	29.3	3.54	48.78	29.3	30.15	39.27
30.1	17.45	43.02	30.1	7.87	48.35	30.2	49.29	60.94	30.3	3.34	48.88	30.3	29.85	39.47
13.64 +13.60			49.72 +49.71			12.29 +12.25			11.86 +11.82			20.42 +20.40		
0h 56m 38s.823			1h 28m 19s.01			4h 8m 52s.234			5h 33m 57s.736			7h 0m 7s.12		
+85° 47′ 27″.59			+88° 50′ 29″.36			+85° 19′ 32″.98			+85° 9′ 21″.38			+87° 11′ 16″.00		

[Eph 13]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			*α* **Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Mar.	0 56	+85 47	Mar.	1 26	+88 50	Mar.	4 8	+85 19	Mar.	5 33	+85 9	Mar.	7 0	+87 11
	s	″		s	″		s	″		s	″		s	″
1.1	17.62	43.25	1.1	68.58	48.55	1.2	49.52	60.94	1.3	63.54	48.78	1.3	30.15	39.27
2.1	17.45	43.02	2.1	67.87	48.35	2.2	49.29	60.94	2.3	63.34	48.88	2.3	29.85	39.47
3.1	17.28	42.80	3.1	67.12	48.15	3.2	49.05	60.93	3.3	63.13	48.98	3.3	29.55	39.67
4.1	17.09	42.56	4.1	66.34	47.94	4.2	48.79	60.92	4.3	62.90	49.09	4.3	29.24	39.88
5.1	16.90	42.30	5.1	65.55	47.72	5.2	48.53	60.90	5.3	62.64	49.19	5.3	28.89	40.09
6.1	16.73	42.02	6.1	64.76	47.47	6.2	48.26	60.86	6.3	62.38	49.28	6.3	28.52	40.30
7.1	16.56	41.73	7.1	64.00	47.20	7.2	47.98	60.82	7.3	62.12	49.36	7.3	28.13	40.49
8.1	16.41	41.42	8.1	63.28	46.92	8.2	47.70	60.74	8.3	61.84	49.40	8.3	27.72	40.67
9.1	16.27	41.10	9.1	62.64	46.63	9.2	47.43	60.63	9.3	61.57	49.43	9.3	27.29	40.82
10.1	16.16	40.78	10.1	62.07	46.33	10.2	47.17	60.51	10.3	61.30	49.44	10.3	26.86	40.94
11.1	16.08	40.45	11.1	61.59	46.03	11.2	46.93	60.38	11.3	61.04	49.42	11.3	26.45	41.05
12.1	16.00	40.14	12.1	61.18	45.74	12.2	46.70	60.23	12.3	60.81	49.39	12.3	26.04	41.14
13.1	15.93	39.85	13.1	60.82	45.46	13.2	46.48	60.10	13.3	60.59	49.36	13.3	25.66	41.22
14.1	15.87	39.58	14.1	60.46	45.21	14.2	46.29	59.97	14.3	60.38	49.34	14.3	25.31	41.30
15.1	15.81	39.32	15.1	60.07	44.97	15.2	46.10	59.87	15.3	60.17	49.33	15.3	24.98	41.39
16.1	15.72	39.09	16.1	59.64	44.73	16.2	45.90	59.78	16.2	59.97	49.34	16.3	24.66	41.50
17.1	15.63	38.85	17.1	59.15	44.51	17.2	45.69	59.71	17.2	59.76	49.37	17.3	24.33	41.62
18.1	15.52	38.60	18.1	58.61	44.27	18.2	45.46	59.64	18.2	59.55	49.40	18.3	23.98	41.76
19.0	15.40	38.32	19.1	58.04	44.02	19.2	45.23	59.56	19.2	59.30	49.43	19.3	23.60	41.90
20.0	15.29	38.01	20.1	57.49	43.72	20.2	44.98	59.44	20.2	59.05	49.44	20.3	23.18	42.04
21.0	15.19	37.69	21.1	56.98	43.42	21.2	44.73	59.30	21.2	58.78	49.42	21.3	22.75	42.15
22.0	15.13	37.35	22.1	56.57	43.09	22.2	44.49	59.13	22.2	58.50	49.38	22.3	22.29	42.23
23.0	15.09	37.01	23.1	56.26	42.76	23.2	44.26	58.94	23.2	58.24	49.30	23.3	21.84	42.28
24.0	15.08	36.68	24.1	56.05	42.44	24.2	44.05	58.73	24.2	57.99	49.20	24.3	21.39	42.31
25.0	15.09	36.36	25.1	55.90	42.11	25.2	43.86	58.52	25.2	57.77	49.09	25.3	20.96	42.31
26.0	15.09	36.06	26.1	55.79	41.81	26.2	43.68	58.32	26.2	57.56	48.98	26.3	20.57	42.32
27.0	15.10	35.78	27.0	55.69	41.53	27.2	43.52	58.14	27.2	57.36	48.88	27.3	20.19	42.32
28.0	15.10	35.50	28.0	55.55	41.26	28.2	43.35	57.97	28.2	57.16	48.79	28.3	19.83	42.33
29.0	15.08	35.24	29.0	55.37	40.99	29.2	43.18	57.81	29.2	56.96	48.72	29.3	19.47	42.37
30.0	15.06	34.97	30.0	55.14	40.73	30.2	43.01	57.65	30.2	56.75	48.66	30.3	19.10	42.41
31.0	15.02	34.68	31.0	54.87	40.46	31.1	42.81	57.50	31.2	56.54	48.61	31.3	18.71	42.46
32.0	14.99	34.38	32.0	54.59	40.18	32.1	42.61	57.34	32.2	56.31	48.56	32.3	18.31	42.51
	13.64	+13.60		49.65	+49.64		12.29	+12.25		11.86	+11.82		20.43	+20.41
	$0^h\ 56^m$	$38^s.823$		$1^h\ 28^m$	$19^s.01$		$4^h\ 8^m$	$52^s.234$		$5^h\ 33^m$	$57^s.736$		$7^h\ 0^m$	$7^s.12$
	+85° 47′	27″.59		+88° 50′	29″.36		+85° 19′	32″.98		+85° 9′	21″.38		+87° 11′	16″.00

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			*α* **Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Apr.	0 56	+85 47	Apr.	1 26	+88 50	Apr.	4 8	+85 19	Apr.	5 33	+85 9	Apr.	7 0	+87 11
	s	″		s	″		s	″		s	″		s	″
1.0	14.99	34.38	1.0	54.59	40.18	1.1	42.61	57.34	1.2	56.31	48.56	1.3	18.31	42.51
2.0	14.96	34.06	2.0	54.32	39.87	2.1	42.39	57.16	2.2	56.08	48.49	2.3	17.89	42.56
3.0	14.93	33.74	3.0	54.07	39.56	3.1	42.18	56.97	3.2	55.83	48.41	3.3	17.45	42.60
4.0	14.92	33.40	4.0	53.86	39.22	4.1	41.97	56.75	4.2	55.57	48.30	4.3	17.00	42 62
5.0	14.92	33.06	5.0	53.73	38.88	5.1	41.78	56.53	5.2	55.32	48.17	5.3	16.52	42.62
5.9	14.95	32.72	6.0	53.68	38.52	6.1	41.59	56.27	6.2	55.07	48.03	6.3	16.05	42.59
6.9	15.01	32.38	7.0	53.70	38.18	7.1	41.41	56.01	7.2	54.84	47.86	7.2	15.59	42.55
7.9	15.09	32.05	8.0	53.80	37.84	8.1	41.26	55.74	8.2	54.62	47.68	8.2	15.15	42.47
8.9	15.17	31.74	9.0	53.95	37.51	9.1	41.12	55.46	9.2	54.43	47.49	9.2	14.74	42.38
9.9	15.26	31.45	10.0	54.13	37.22	10.1	41.01	55.20	10.2	54.25	47.30	10.2	14.36	42.30
10.9	15.35	31.18	11.0	54.31	36.94	11.1	40.89	54.96	11.2	54.09	47.13	11.2	14.01	42.22
11.9	15.43	30.93	12.0	54.45	36.67	12.1	40.78	54.74	12.2	53.93	46.98	12.2	13.67	42.16
12.9	15.49	30.69	13.0	54.52	36.41	13.1	40.67	54.54	13.2	53.76	46.85	13.2	13.33	42.11
13.9	15.53	30.44	13.9	54.56	36.14	14.1	40.54	54.35	14.2	53.59	46.72	14.2	12.98	42.08
14.9	15.57	30.18	14.9	54.56	35.89	15.1	40.40	54.15	15.2	53.41	46.61	15.2	12.62	42.07
15.9	15.60	29.90	15.9	54.55	35.60	16.1	40.24	53.94	16.2	53.21	46.48	16.2	12.23	42.04
16.9	15.66	29.59	16.9	54.57	35.29	17.1	40.08	53.69	17.2	52.99	46.33	17.2	11.81	41.99
17.9	15.73	29.27	17.9	54.67	34.96	18.1	39.93	53.42	18.2	52.78	46.14	18.2	11.37	41.92
18.9	15.82	28.95	18.9	54.87	34.62	19.1	39.80	53.14	19.2	52.57	45.93	19.2	10.92	41.81
19.9	15.95	28.64	19.9	55.16	34.29	20.1	39.69	52.82	20.2	52.38	45.70	20.2	10.50	41.68
20.9	16.10	28.34	20.9	55.54	33.97	21.1	39.60	52.50	21.2	52.22	45.46	21.2	10.10	41.53
21.9	16.26	28.06	21.9	55.97	33.67	22.1	39.53	52.19	22.1	52.06	45.21	22.2	9.72	41.37
22.9	16.42	27.81	22.9	56.42	33.39	23.1	39.47	51.90	23.1	51.93	44.96	23.2	9.37	41.20
23.9	16.58	27.57	23.9	56.85	33.12	24.1	39.42	51.63	24.1	51.80	44.74	24.2	9.04	41.06
24.9	16.72	27.34	24.9	57.24	32.87	25.1	39.37	51.37	25.1	51.68	44.53	25.2	8.74	40.93
25.9	16.85	27.11	25.9	57.59	32.63	26.1	39.31	51.12	26.1	51.55	44.33	26.2	8.43	40.81
26.9	16.97	26.88	26.9	57.89	32.38	27.1	39.24	50.88	27.1	51.42	44.15	27.2	8.11	40.70
27.9	17.08	26.64	27.9	58.15	32.12	28.1	39.16	50.64	28.1	51.27	43.96	28.2	7.78	40.60
28.9	17.19	26.40	28.9	58.41	31.85	29.1	39.07	50.39	29.1	51.12	43.77	29.2	7.42	40.49
29.9	17.31	26.13	29.9	58.69	31.56	30.1	38.98	50.13	30.1	50.96	43.57	30.2	7.05	40.38
30.9	17.44	25.85	30.9	59.01	31.27	31.1	38.89	49.85	31.1	50.79	43.35	31.2	6.67	40.25
31.9	17.59	25.57	31.9	59.39	30.97	32.1	38.81	49.56	32.1	50.63	43.10	32.2	6.29	40.10
13.63		+13.59	49.53		+49.52	12.29		+12.25	11.86		+11.82	20.43		+20.41
0h 56m		38s.823	1h 28m		19s.01	4h 8m		52s.234	5h 33m		57s.736	7h 0m		7s.12
+85° 47′		27″.59	+88° 50′		29″.36	+85° 19′		32″.98	+85° 9′		21″.38	+87° 11′		16″.00

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			**α Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
May	0 56	+85 47	May	1 26	+88 50	May	4 8	+85 19	May	5 33	+85 9	May	6 59	+87 11
	s	″		s	″		s	″		s	″		s	″
1.9	17.59	25.57	1.9	59.39	30.97	1.1	38.89	49.85	1.1	50.79	43.35	1.2	66.67	40.25
2.9	17.75	25.29	2.9	59.84	30.66	2.1	38.81	49.56	2.1	50.63	43.10	2.2	66.29	40.10
3.9	17.94	25.01	3.9	60.37	30.35	3.1	38.73	49.25	3.1	50.47	42.85	3.2	65.90	39.92
4.9	18.13	24.75	4.9	60.97	30.06	4.1	38.67	48.92	4.1	50.33	42.57	4.2	65.52	39.74
5.9	18.35	24.51	5.9	61.63	29.78	5.1	38.64	48.58	5.1	50.19	42.28	5.2	65.16	39.52
6.9	18.58	24.28	6.9	62.32	29.52	6.1	38.62	48.25	6.1	50.09	41.98	6.2	64.82	39.30
7.9	18.80	24.09	7.9	63.01	29.29	7.0	38.63	47.93	7.1	50.00	41.68	7.2	64.52	39.06
8.9	19.02	23.91	8.9	63.69	29.08	8.0	38.64	47.63	8.1	49.93	41.40	8.2	64.25	38.84
9.9	19.23	23.74	9.9	64.30	28.87	9.0	38.66	47.34	9.1	49.87	41.14	9.2	64.01	38.62
10.9	19.41	23.57	10.9	64.86	28.68	10.0	38.68	47.08	10.1	49.80	40.89	10.2	63.78	38.43
11.9	19.58	23.39	11.9	65.35	28.48	11.0	38.69	46.84	11.1	49.73	40.66	11.2	63.55	38.25
12.9	19.75	23.21	12.9	65.83	28.26	12.0	38.68	46.61	12.1	49.65	40.44	12.2	63.31	38.08
13.9	19.92	23.01	13.9	66.32	28.02	13.0	38.65	46.35	13.1	49.56	40.22	13.2	63.04	37.92
14.9	20.10	22.78	14.9	66.87	27.77	14.0	38.63	46.09	14.1	49.46	39.99	14.1	62.75	37.75
15.9	20.31	22.55	15.9	67.52	27.51	15.0	38.61	45.80	15.1	49.35	39.73	15.1	62.43	37.55
16.9	20.56	22.33	16.9	68.25	27.25	16.0	38.60	45.49	16.1	49.25	39.44	16.1	62.11	37.32
17.9	20.82	22.12	17.9	69.07	27.01	17.0	38.62	45.15	17.1	49.17	39.13	17.1	61.81	37.08
18.9	21.09	21.94	18.9	69.96	26.78	18.0	38.66	44.80	18.1	49.10	38.80	18.1	61.52	36.81
19.9	21.38	21.78	19.9	70.86	26.57	19.0	38.71	44.47	19.1	49.05	38.47	19.1	61.27	36.52
20.9	21.65	21.64	20.9	71.76	26.39	20.0	38.78	44.15	20.1	49.02	38.15	20.1	61.05	36.23
21.9	21.91	21.52	21.9	72.61	26.22	21.0	38.85	43.85	21.1	49.00	37.84	21.1	60.86	35.94
22.9	22.17	21.41	22.9	73.41	26.08	22.0	38.94	43.57	22.1	48.99	37.55	22.1	60.69	35.67
23.9	22.40	21.29	23.9	74.17	25.92	23.0	39.01	43.31	23.1	48.98	37.27	23.1	60.52	35.43
24.9	22.61	21.17	24.9	74.88	25.76	24.0	39.08	43.06	24.1	48.97	37.01	24.1	60.36	35.20
25.9	22.82	21.04	25.9	75.56	25.59	24.9	39.14	42.81	25.1	48.95	36.77	25.1	60.18	34.98
26.9	23.05	20.90	26.9	76.26	25.41	25.9	39.19	42.56	26.1	48.92	36.52	26.1	59.99	34.76
27.9	23.28	20.75	27.9	76.98	25.22	26.9	39.23	42.29	27.1	48.89	36.27	27.1	59.79	34.55
28.9	23.51	20.59	28.9	77.74	25.02	27.9	39.27	42.01	28.0	48.85	36.01	28.1	59.57	34.31
29.9	23.77	20.43	29.9	78.56	24.82	28.9	39.31	41.72	29.0	48.80	35.71	29.1	59.35	34.06
30.8	24.05	20.29	30.9	79.46	24.62	29.9	39.37	41.42	30.0	48.76	35.40	30.1	59.12	33.80
31.8	24.35	20.14	31.9	80.42	24.44	30.9	39.45	41.11	31.0	48.73	35.08	31.1	58.90	33.51
32.8	24.66	20.02	32.9	81.45	24.26	31.9	39.54	40.79	32.0	48.71	34.74	32.1	58.71	33.19
	13.62	+13.58		49.44	+49.43		12.28	+12.24		11.85	+11.81		20.43	+20.40
	$0^h\ 56^m$	$38^s.823$		$1^h\ 28^m$	$19^s.01$		$4^h\ 8^m$	$52^s.234$		$5^h\ 33^m$	$57^s.736$		$7^h\ 0^m$	$7^s.12$
	+85° 47′	27″.59		+88° 50′	29″.36		+85° 19′	32″.98		+85° 9′	21″.38		+87° 11′	16″.00

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			**α Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
June	0 56	+85 47	June	1 27	+88 50	June	4 8	+85 19	June	5 33	+85 9	June	6 59	+87 11
	s	″		s	″		s	″		s	″		s	″
1.8	24.66	20.02	1.9	21.45	24.26	1.9	39.65	40.46	1.0	48.71	34.74	1.1	58.71	33.19
2.8	24.98	19.91	2.9	22.50	24.11	2.9	39.78	40.15	2.0	48.73	34.39	2.1	58.54	32.87
3.8	25.29	19.84	3.9	23.58	23.98	3.9	39.93	39.86	3.0	48.76	34.06	3.1	58.40	32.54
4.8	25.60	19.78	4.9	24.63	23.89	4.9	40.08	39.59	4.0	48.81	33.73	4.1	58.29	32.21
5.8	25.89	19.75	5.9	25.62	23.80	5.9	40.23	39.35	5.0	48.86	33.42	5.1	58.22	31.90
6.8	26.16	19.72	6.9	26.55	23.73	6.9	40.37	39.12	6.0	48.93	33.13	6.1	58.17	31.60
7.8	26.42	19.69	7.8	27.40	23.65	7.9	40.50	38.90	7.0	48.99	32.86	7.1	58.12	31.33
8.8	26.66	19.64	8.8	28.23	23.57	8.9	40.62	38.69	8.0	49.04	32.61	8.1	58.07	31.08
9.8	26.91	19.58	9.8	29.05	23.46	9.9	40.74	38.46	9.0	49.08	32.36	9.1	58.00	30.83
10.8	27.16	19.51	10.8	29.89	23.34	10.9	40.84	38.22	10.0	49.11	32.11	10.1	57.89	30.58
11.8	27.43	19.42	11.8	30.80	23.21	11.9	40.96	37.94	11.0	49.13	31.84	11.1	57.78	30.32
12.8	27.73	19.34	12.8	31.80	23.07	12.9	41.08	37.65	12.0	49.15	31.53	12.1	57.66	30.03
13.8	28.05	19.26	13.8	32.89	22.95	13.9	41.22	37.36	13.0	49.18	31.21	13.1	57.54	29.72
14.8	28.39	19.21	14.8	34.05	22.84	14.9	41.40	37.06	14.0	49.22	30.87	14.1	57.43	29.39
15.8	28.74	19.18	15.8	35.24	22.75	15.9	41.59	36.79	15.0	49.30	30.52	15.1	57.35	29.04
16.8	29.08	19.18	16.8	36.43	22.70	16.9	41.80	36.53	15.9	49.38	30.18	16.1	57.32	28.68
17.8	29.40	19.19	17.8	37.57	22.66	17.9	42.00	36.29	16.9	49.49	29.86	17.1	57.31	28.33
18.8	29.71	19.22	18.8	38.65	22.64	18.9	42.21	36.07	17.9	49.60	29.56	18.1	57.33	27.99
19.8	30.00	19.26	19.8	39.67	22.63	19.9	42.40	35.88	18.9	49.72	29.27	19.0	57.36	27.68
20.8	30.27	19.30	20.8	40.64	22.62	20.9	42.59	35.69	19.9	49.84	29.01	20.0	57.40	27.39
21.8	30.54	19.32	21.8	41.58	22.59	21.9	42.76	35.49	20.9	49.95	28.76	21.0	57.44	27.11
22.8	30.80	19.33	22.8	42.50	22.56	22.9	42.92	35.29	21.9	50.05	28.51	22.0	57.46	26.84
23.8	31.07	19.33	23.8	43.43	22.51	23.9	43.08	35.09	22.9	50.14	28.26	23.0	57.46	26.56
24.8	31.34	19.33	24.8	44.39	22.46	24.9	43.24	34.87	23.9	50.23	28.01	24.0	57.45	26.28
25.8	31.64	19.32	25.8	45.41	22.40	25.9	43.41	34.63	24.9	50.30	27.74	25.0	57.43	26.00
26.8	31.94	19.31	26.8	46.48	22.34	26.9	43.60	34.38	25.9	50.39	27.46	26.0	57.42	25.69
27.8	32.27	19.31	27.8	47.61	22.29	27.9	43.80	34.13	26.9	50.48	27.16	27.0	57.40	25.36
28.8	32.61	19.34	28.8	48.80	22.25	28.9	44.01	33.89	27.9	50.59	26.85	28.0	57.40	25.02
29.8	32.96	19.37	29.8	50.03	22.23	29.9	44.25	33.65	28.9	50.71	26.52	29.0	57.41	24.66
30.8	33.30	19.43	30.8	51.27	22.25	30.9	44.50	33.43	29.9	50.84	26.20	30.0	57.46	24.30
31.8	33.65	19.53	31.8	52.49	22.28	31.9	44.76	33.22	30.9	51.00	25.89	31.0	57.55	23.94
32.8	33.96	19.64	32.8	53.67	22.34	32.9	45.01	33.05	31.9	51.18	25.60	32.0	57.67	23.58
13.62		+13.58	49.38		+49.37	12.27		+12.23	11.85		+11.81	20.41		+20.38
$0^h\ 56^m$		$38^s.823$	$1^h\ 28^m$		$19^s.01$	4^h	8^m	$52^s.234$	5^h	33^m	$57^s.736$	7^h	0^m	$7^s.12$
+85° 47′		27″.59	+88° 50′		29″.36	+85° 19′		32″.98	+85° 9′		21″.38	+87° 11′		16″.00

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			*α* **Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
July	0 56	+85 47	July	1 27	+88 50	July	4 8	+85 19	July	5 33	+85 9	July	6 59	+87 11
	s	″		s	″		s	″		s	″		s	″
1.8	33.65	19.53	1.8	52.49	22.28	1.9	44.76	33.22	1.9	51.18	25.60	1.0	57.55	23.94
2.8	33.96	19.64	2.8	53.67	22.34	2.9	45.01	33.05	2.9	51.37	25.33	2.0	57.67	23.58
3.8	34.27	19.77	3.8	54.78	22.41	3.9	45.27	32.90	3.9	51.55	25.09	3.0	57.83	23.25
4.8	34.55	19.90	4.8	55.81	22.48	4.9	45.51	32.77	4.9	51.72	24.86	4.0	57.99	22.94
5.8	34.82	20.01	5.8	56.79	22.55	5.9	45.74	32.65	5.9	51.89	24.65	5.0	58.15	22.64
6.7	35.08	20.11	6.8	57.72	22.60	6.9	45.96	32.52	6.9	52.04	24.44	6.0	58.29	22.39
7.7	35.34	20.19	7.8	58.68	22.64	7.9	46.17	32.37	7.9	52.19	24.21	6.9	58.42	22.12
8.7	35.63	20.26	8.8	59.68	22.68	8.9	46.37	32.21	8.9	52.32	23.97	7.9	58.53	21.84
9.7	35.93	20.32	9.8	60.76	22.68	9.9	46.59	32.02	9.9	52.46	23.70	8.9	58.61	21.54
10.7	36.25	20.38	10.8	61.91	22.70	10.9	46.83	31.82	10.9	52.62	23.41	9.9	58.68	21.23
11.7	36.58	20.47	11.8	63.14	22.73	11.9	47.09	31.61	11.9	52.79	23.11	10.9	58.78	20.88
12.7	36.93	20.58	12.8	64.39	22.78	12.9	47.36	31.42	12.9	52.98	22.81	11.9	58.90	20.53
13.7	37.28	20.72	13.8	65.66	22.87	13.9	47.65	31.25	13.9	53.19	22.54	12.9	59.04	20.17
14.7	37.61	20.88	14.7	66.88	22.97	14.9	47.94	31.10	14.9	53.41	22.28	13.9	59.23	19.81
15.7	37.92	21.06	15.7	68.06	23.10	15.9	48.24	30.98	15.9	53.64	22.03	14.9	59.45	19.46
16 7	38.22	21.24	16.7	69.16	23.23	16.9	48.52	30.88	16.9	53.87	21.82	15.9	59.69	19.14
17.7	38.50	21.42	17.7	70.19	23.36	17.9	48.80	30.79	17.9	54.09	21.63	16.9	59.93	18.84
18.7	38.75	21.60	18.7	71.18	23.49	18.8	49.06	30.71	18.9	54.30	21.45	17.9	60.17	18.55
19.7	39.00	21.77	19.7	72.14	23.61	19.8	49.31	30.62	19.9	54.49	21.26	18.9	60.39	18.28
20.7	39.25	21.92	20.7	73.10	23.72	20.8	49.56	30.52	20.9	54.68	21.07	19.9	60.60	18.01
21.7	39.52	22.06	21.7	74.06	23.82	21.8	49.81	30.42	21.9	54.87	20.86	20.9	60.80	17.74
22.7	39.79	22.20	22.7	75.07	23.91	22.8	50.05	30.29	22.9	55.06	20.64	21.9	60.99	17.47
23.7	40.07	22.33	23.7	76.11	24.00	23.8	50.30	30.16	23.9	55.25	20.41	22.9	61.16	17.19
24.7	40.37	22.48	24.7	77.22	24.08	24.8	50.57	30.03	24.9	55.45	20.18	23.9	61.34	16.90
25.7	40.68	22.64	25.7	78.38	24.18	25.8	50.84	29.89	25.9	55.67	19.94	24.9	61.53	16.58
26.7	41.00	22.81	26.7	79.57	24.30	26.8	51.15	29.76	26.9	55.89	19.69	25.9	61.73	16.24
27.7	41.32	23.02	27.7	80.79	24.44	27.8	51.46	29.64	27.9	56.14	19.44	26.9	61.97	15.90
28.7	41.64	23.23	28.7	82.00	24.62	28.8	51.78	29.55	28.9	56.40	19.21	27.9	62.25	15.57
29.7	41.94	23.47	29.7	83.16	24.81	29.8	52.11	29.49	29.9	56.68	19.01	28.9	62.55	15.24
30.7	42.23	23.73	30.7	84.25	25.02	30.8	52.44	29.45	30.9	56.96	18.84	29.9	62.88	14.93
31.7	42.48	24.00	31.7	85.26	25.24	31.8	52.75	29.44	31.9	57.24	18.68	30.9	63.23	14.63
32.7	42.72	24.25	32.7	86.20	25.47	32.8	53.06	29.43	32.9	57.50	18.55	31.9	63.59	14.37
	13.62	+13.58		49.39	+49.38		12.27	+12.23		11.84	+11.80		20.39	+20.36
	$0^{h}\ 56^{m}\ 38^{s}.823$			$1^{h}\ 28^{m}\ 19^{s}.01$			$4^{h}\ 8^{m}\ 52^{s}.234$			$5^{h}\ 33^{m}\ 57^{s}.736$			$7^{h}\ 0^{m}\ 7^{s}.12$	
	+85° 47′ 27″.59			+88° 50′ 29″.36			+85° 19′ 32″.98			+85° 9′ 21″.38			+87° 11′ 16″.00	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			**α Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Aug.	0 56	+85 47	Aug.	1 28	+88 50	Aug.	4 8	+85 19	Aug.	5 33	+85 9	Aug.	7 0	+87 11
	s	″		s	″		s	″		s	″		s	″
1.7	42.72	24.25	1.7	26.20	25.47	1.8	53.06	29.43	1.9	57.50	18.55	1.9	3.93	14.13
2.7	42.94	24.50	2.7	27.08	25.67	2.8	53.34	29.42	2.9	57.75	18.43	2.9	4.25	13.90
3.7	43.17	24.74	3.7	27.96	25.86	3.8	53.61	29.40	3.9	57.98	18.29	3.9	4.55	13.67
4.7	43.40	24.94	4.7	28.85	26.02	4.8	53.87	29.36	4.9	58.22	18.14	4.9	4.83	13.42
5.7	43.64	25.14	5.7	29.81	26.18	5.8	54.14	29.30	5.9	58.44	17.97	5.9	5.09	13.16
6.7	43.91	25.34	6.7	30.85	26.34	6.8	54.43	29.22	6.9	58.67	17.78	6.9	5.37	12.87
7.7	44.21	25.55	7.7	31.95	26.50	7.8	54.73	29.14	7.9	58.92	17.57	7.9	5.66	12.56
8.7	44.50	25.79	8.7	33.10	26.69	8.8	55.06	29.07	8.9	59.19	17.37	8.9	5.98	12.24
9.7	44.80	26.04	9.7	34.27	26.89	9.8	55.40	29.01	9.8	59.48	17.17	9.9	6.33	11.93
10.7	45.08	26.32	10.7	35.41	27.13	10.8	55.75	28.98	10.8	59.78	16.99	10.9	6.71	11.63
11.7	45.36	26.63	11.7	36.49	27.38	11.8	56.09	28.98	11.8	60.08	16.84	11.9	7.12	11.36
12.6	45.60	26.94	12.7	37.49	27.65	12.8	56.43	28.99	12.8	60.39	16.72	12.9	7.53	11.10
13.6	45.83	27.24	13.7	38.42	27.92	13.8	56.75	29.03	13.8	60.68	16.61	13.9	7.95	10.87
14.6	46.03	27.53	14.7	39.29	28.17	14.8	57.05	29.07	14.8	60.97	16.52	14.9	8.35	10.66
15.6	46.23	27.83	15.7	40.10	28.43	15.8	57.34	29.12	15.8	61.24	16.43	15.9	8.74	10.45
16.6	46.43	28.10	16.7	40.90	28.68	16.8	57.63	29.15	16.8	61.50	16.35	16.9	9.10	10.25
17.6	46.63	28.37	17.7	41.70	28.90	17.8	57.90	29.17	17.8	61.77	16.26	17.9	9.46	10.04
18.6	46.83	28.62	18.7	42.53	29.12	18.8	58.18	29.18	18.8	62.03	16.14	18.9	9.80	9.82
19.6	47.04	28.87	19.7	43.39	29.33	19.8	58.45	29.18	19.8	62.28	16.02	19.9	10.14	9.59
20.6	47.26	29.12	20.6	44.30	29.55	20.8	58.75	29.18	20.8	62.54	15.89	20.9	10.49	9.35
21.6	47.50	29.39	21.6	45.25	29.77	21.8	59.06	29.17	21.8	62.81	15.76	21.9	10.85	9.10
22.6	47.74	29.67	22.6	46.23	30.01	22.8	59.38	29.17	22.8	63.09	15.61	22.9	11.22	8.83
23.6	48.00	29.97	23.6	47.24	30.26	23.8	59.72	29.17	23.8	63.39	15.47	23.9	11.63	8.55
24.6	48.25	30.29	24.6	48.26	30.54	24.7	60.07	29.20	24.8	63.71	15.34	24.9	12.07	8.29
25.6	48.49	30.65	25.6	49.24	30.86	25.7	60.42	29.25	25.8	64.04	15.24	25.9	12.55	8.04
26.6	48.70	31.01	26.6	50.15	31.18	26.7	60.77	29.33	26.8	64.38	15.16	26.9	13.05	7.82
27.6	48.90	31.38	27.6	50.99	31.52	27.7	61.11	29.43	27.8	64.72	15.12	27.9	13.54	7.62
28.6	49.06	31.73	28.6	51.74	31.85	28.7	61.43	29.54	28.8	65.03	15.09	28.9	14.03	7.44
29.6	49.21	32.09	29.6	52.43	32.18	29.7	61.73	29.66	29.8	65.33	15.08	29.9	14.51	7.29
30.6	49.36	32.44	30.6	53.07	32.50	30.7	62.03	29.78	30.8	65.62	15.06	30.8	14.96	7.14
31.6	49.50	32.75	31.6	53.71	32.79	31.7	62.31	29.88	31.8	65.91	15.03	31.8	15.39	6.98
32.6	49.65	33.05	32.6	54.40	33.05	32.7	62.58	29.96	32.8	66.19	14.98	32.8	15.80	6.81
13.63 +13.59			49.45 +49.44			12.27 +12.23			11.84 +11.80			20.36 +20.34		
$0^h\ 56^m\ 38^s.823$			$1^h\ 28^m\ 19^s.01$			$4^h\ 8^m\ 52^s.234$			$5^h\ 33^m\ 57^s.736$			$7^h\ 0^m\ 7^s.12$		
+85° 47′ 27″.59			+88° 50′ 29″.36			+85° 19′ 32″.98			+85° 9′ 21″.38			+87° 11′ 16″.00		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			**α Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Sept.	0 56	+85 47	Sept.	1 28	+88 50	Sept.	4 9	+85 19	Sept.	5 34	+85 9	Sept.	7 0	+87 11
	s	″		s	″		s	″		s	″		s	″
1.6	49.65	33.05	1.6	54.40	33.05	1.7	2.58	29.96	1.8	6.19	14.98	1.8	15.80	6.81
2.6	49.83	33.35	2.6	55.16	33.32	2.7	2.88	30.02	2.8	6.47	14.90	2.8	16.20	6.61
3.6	50.02	33.66	3.6	55.98	33.60	3.7	3.18	30.07	3.8	6.77	14.82	3.8	16.61	6.40
4.6	50.23	33.97	4.6	56.87	33.88	4.7	3.51	30.12	4.8	7.07	14.73	4.8	17.06	6.17
5.6	50.45	34.32	5.6	57.78	34.18	5.7	3.85	30.18	5.8	7.40	14.64	5.8	17.53	5.95
6.6	50.65	34.68	6.6	58.67	34.51	6.7	4.19	30.27	6.8	7.74	14.56	6.8	18.03	5.73
7.6	50.85	35.06	7.6	59.51	34.86	7.7	4.53	30.37	7.8	8.09	14.52	7.8	18.56	5.53
8.6	51.02	35.45	8.6	60.27	35.23	8.7	4.86	30.52	8.8	8.43	14.50	8.8	19.09	5.36
9.6	51.16	35.85	9.6	60.94	35.60	9.7	5.19	30.67	9.8	8.76	14.51	9.8	19.62	5.22
10.6	51.29	36.24	10.6	61.54	35.96	10.7	5.51	30.84	10.8	9.09	14.53	10.8	20.15	5.08
11.6	51.39	36.62	11.6	62.08	36.32	11.7	5.80	31.01	11.8	9.40	14.56	11.8	20.66	4.97
12.6	51.49	36.98	12.6	62.59	36.66	12.7	6.07	31.17	12.8	9.69	14.59	12.8	21.14	4.87
13.6	51.59	37.33	13.6	63.08	36.99	13.7	6.35	31.33	13.8	9.98	14.62	13.8	21.62	4.77
14.6	51.69	37.67	14.6	63.58	37.30	14.7	6.62	31.47	14.7	10.26	14.65	14.8	22.08	4.66
15.6	51.81	38.00	15.6	64.12	37.61	15.7	6.89	31.60	15.7	10.54	14.66	15.8	22.52	4.53
16.6	51.92	38.32	16.6	64.70	37.92	16.7	7.18	31.73	16.7	10.83	14.65	16.8	22.96	4.40
17.5	52.06	38.65	17.6	65.32	38.22	17.7	7.47	31.85	17.7	11.12	14.64	17.8	23.42	4.25
18.5	52.21	38.99	18.6	65.98	38.54	18.7	7.76	31.97	18.7	11.42	14.62	18.8	23.89	4.10
19.5	52.36	39.34	19.6	66.68	38.86	19.7	8.08	32.09	19.7	11.73	14.60	19.8	24.39	3.93
20.5	52.51	39.72	20.6	67.36	39.22	20.7	8.41	32.24	20.7	12.06	14.59	20.8	24.91	3.77
21.5	52.64	40.12	21.6	68.01	39.59	21.7	8.73	32.40	21.7	12.41	14.60	21.8	25.45	3.62
22.5	52.76	40.54	22.6	68.62	39.98	22.7	9.06	32.58	22.7	12.76	14.63	22.8	26.03	3.50
23.5	52.86	40.97	23.6	69.15	40.39	23.7	9.37	32.80	23.7	13.11	14.70	23.8	26.62	3.41
24.5	52.92	41.39	24.6	69.57	40.81	24.7	9.67	33.03	24.7	13.44	14.78	24.8	27.19	3.33
25.5	52.98	41.81	25.5	69.92	41.22	25.7	9.96	33.27	25.7	13.77	14.88	25.8	27.76	3.28
26.5	53.01	42.20	26.5	70.22	41.61	26.7	10.21	33.51	26.7	14.08	14.99	26.8	28.30	3.25
27.5	53.05	42.57	27.5	70.51	41.98	27.7	10.46	33.73	27.7	14.37	15.09	27.8	28.81	3.22
28.5	53.09	42.93	28.5	70.82	42.33	28.7	10.71	33.94	28.7	14.65	15.18	28.8	29.30	3.16
29.5	53.15	43.27	29.5	71.18	42.66	29.6	10.97	34.12	29.7	14.93	15.24	29.8	29.78	3.10
30.5	53.22	43.62	30.5	71.61	43.00	30.6	11.23	34.29	30.7	15.22	15.29	30.8	30.26	3.01
31.5	53.32	43.98	31.5	72.11	43.34	31.6	11.52	34.46	31.7	15.52	15.32	31.8	30.75	2.90
	13.63	+13.60		49.56	+49.55		12.27	+12.23		11.84	+11.80		20.36	+20.33
	0^{h} 56^{m}	$38^{s}.823$		1^{h} 28^{m}	$19^{s}.01$		4^{h} 8^{m}	$52^{s}.234$		5^{h} 33^{m}	$57^{s}.736$		7^{h} 0^{m}	$7^{s}.12$
	+85° 47′	27″.59		+88° 50′	29″.36		+85° 19′	32″.98		+85° 9′	21″.38		+87° 11′	16″.00

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			**α Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Oct.	0 56	+85 47	Oct.	1 29	+88 50	Oct.	4 9	+85 19	Oct.	5 34	+85 9	Oct.	7 0	+87 11
	s	″		s	″		s	″		s	″		s	″
1.5	53.32	43.98	1.5	12.11	43.34	1.6	11.52	34.46	1.7	15.52	15.32	1.8	30.75	2.90
2.5	53.42	44.36	2.5	12.64	43.71	2.6	11.82	34.64	2.7	15.84	15.36	2.8	31.27	2.79
3.5	53.52	44.76	3.5	13.16	44.09	3.6	12.12	34.84	3.7	16.18	15.41	3.8	31.82	2.68
4.5	53.61	45.18	4.5	13.64	44.49	4.6	12.43	35.05	4.7	16.52	15.49	4.8	32.40	2.59
5.5	53.67	45.60	5.5	14.05	44.91	5.6	12.73	35.30	5.7	16.86	15.58	5.8	33.00	2.53
6.5	53.71	46.03	6.5	14.37	45.33	6.6	13.01	35.57	6.7	17.19	15.71	6.7	33.59	2.49
7.5	53.73	46.45	7.5	14.60	45.75	7.6	13.28	35.85	7.7	17.51	15.85	7.7	34.18	2.48
8.5	53.72	46.86	8.5	14.76	46.16	8.6	13.54	36.14	8.7	17.82	16.00	8.7	34.74	2.49
9.5	53.71	47.25	9.5	14.87	46.55	9.6	13.78	36.41	9.7	18.11	16.17	9.7	35.29	2.50
10.5	53.69	47.63	10.5	14.96	46.94	10.6	14.00	36.67	10.7	18.39	16.32	10.7	35.81	2.53
11.5	53.67	47.99	11.5	15.05	47.30	11.6	14.20	36.93	11.7	18.66	16.46	11.7	36.30	2.54
12.5	53.66	48.35	12.5	15.17	47.66	12.6	14.42	37.17	12.7	18.92	16.60	12.7	36.79	2.55
13.5	53.66	48.70	13.5	15.32	48.01	13.6	14.64	37.40	13.7	19.18	16.71	13.7	37.28	2.54
14.5	53.67	49.04	14.5	15.51	48.35	14.6	14.86	37.62	14.7	19.45	16.82	14.7	37.76	2.53
15.5	53.70	49.39	15.5	15.74	48.70	15.6	15.09	37.84	15.7	19.72	16.92	15.7	38.24	2.50
16.5	53.72	49.74	16.5	16.00	49.05	16.6	15.34	38.06	16.7	20.02	17.03	16.7	38.75	2.47
17.5	53.75	50.13	17.5	16.26	49.43	17.6	15.59	38.30	17.7	20.32	17.14	17.7	39.29	2.43
18.5	53.77	50.53	18.5	16.50	49.82	18.6	15.85	38.54	18.7	20.63	17.27	18.7	39.86	2.42
19.5	53.78	50.94	19.5	16.70	50.24	19.6	16.11	38.82	19.7	20.95	17.42	19.7	40.43	2.42
20.5	53.76	51.37	20.5	16.82	50.66	20.6	16.37	39.13	20.7	21.26	17.58	20.7	41.02	2.44
21.5	53.72	51.79	21.5	16.85	51.10	21.6	16.61	39.45	21.6	21.57	17.79	21.7	41.61	2.50
22.5	53.66	52.21	22.5	16.79	51.53	22.6	16.83	39.78	22.6	21.87	18.01	22.7	42.19	2.57
23.5	53.57	52.61	23.5	16.66	51.95	23.6	17.02	40.12	23.6	22.15	18.25	23.7	42.74	2.66
24.4	53.49	53.00	24.5	16.50	52.34	24.6	17.20	40.45	24.6	22.42	18.46	24.7	43.26	2.77
25.4	53.40	53.35	25.5	16.35	52.71	25.6	17.38	40.75	25.6	22.66	18.68	25.7	43.76	2.86
26.4	53.33	53.68	26.5	16.23	53.05	26.6	17.55	41.04	26.6	22.89	18.88	26.7	44.24	2.92
27.4	53.29	54.01	27.5	16.19	53.40	27.6	17.73	41.31	27.6	23.13	19.04	27.7	44.70	2.96
28.4	53.26	54.34	28.5	16.21	53.74	28.6	17.92	41.57	28.6	23.38	19.20	28.7	45.18	2.99
29.4	53.24	54.69	29.5	16.28	54.10	29.6	18.13	41.83	29.6	23.64	19.34	29.7	45.68	3.01
30.4	53.22	55.07	30.5	16.36	54.47	30.6	18.35	42.10	30.6	23.92	19.50	30.7	46.21	3.04
31.4	53.18	55.46	31.5	16.40	54.87	31.6	18.58	42.39	31.6	24.21	19.68	31.7	46.76	3.07
32.4	53.13	55.87	32.4	16.39	55.29	32.6	18.80	42.70	32.6	24.49	19.88	32.7	47.33	3.14
	13.64	+13.61		49.69	+49.68		12.28	+12.23		11.84	+11.80		20.36	+20.33
$0^h\ 56^m\ 38^s.823$			$1^h\ 28^m\ 19^s.01$			$4^h\ 8^m\ 52^s.234$			$5^h\ 33^m\ 57^s.736$			$7^h\ 0^m\ 7^s.12$		
+85° 47′ 27″.59			+88° 50′ 29″.36			+85° 19′ 32″.98			+85° 9′ 21″.38			+87° 11′ 16″.00		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			***α* Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Nov.	0 56	+85 47	Nov.	1 29	+88 50	Nov.	4 9	+85 19	Nov.	5 34	+85 9	Nov.	7 0	+87 11
	s	″		s	″		s	″		s	″		s	″
1.4	53.13	55.87	1.4	16.39	55.29	1.6	18.80	42.70	1.6	24.49	19.88	1.7	47.33	3.14
2.4	53.05	56.27	2.4	16.28	55.71	2.6	19.01	43.04	2.6	24.78	20.11	2.7	47.90	3.23
3.4	52.95	56.68	3.4	16.08	56.13	3.6	19.20	43.40	3.6	25.05	20.36	3.7	48.46	3.35
4.4	52.83	57.07	4.4	15.81	56.54	4.6	19.37	43.76	4.6	25.32	20.62	4.7	49.00	3.48
5.4	52.69	57.43	5.4	15.48	56.93	5.5	19.52	44.12	5.6	25.56	20.89	5.7	49.52	3.64
6.4	52.55	57.77	6.4	15.11	57.29	6.5	19.66	44.46	6.6	25.79	21.16	6.7	50.00	3.79
7.4	52.40	58.10	7.4	14.73	57.65	7.5	19.78	44.80	7.6	26.00	21.43	7.7	50.46	3.94
8.4	52.27	58.42	8.4	14.37	57.99	8.5	19.89	45.12	8.6	26.21	21.68	8.7	50.91	4.08
9.4	52.15	58.71	9.4	14.03	58.32	9.5	20.01	45.43	9.6	26.40	21.92	9.7	51.33	4.22
10.4	52.03	59.01	10.4	13.74	58.63	10.5	20.13	45.73	10.6	26.60	22.14	10.7	51.75	4.34
11.4	51.94	59.31	11.4	13.50	58.95	11.5	20.26	46.02	11.6	26.81	22.35	11.7	52.19	4.46
12.4	51.84	59.62	12.4	13.27	59.28	12.5	20.40	46.30	12.6	27.02	22.56	12.6	52.64	4.56
13.4	51.74	59.93	13.4	13.07	59.63	13.5	20.55	46.59	13.6	27.24	22.78	13.6	53.11	4.66
14.4	51.65	60.27	14.4	12.85	59.99	14.5	20.71	46.91	14.6	27.47	23.00	14.6	53.60	4.77
15.4	51.54	60.63	15.4	12.59	60.36	15.5	20.86	47.24	15.6	27.71	23.24	15.6	54.10	4.90
16.4	51.42	60.99	16.4	12.27	60.75	16.5	21.02	47.60	16.6	27.96	23.51	16.6	54.62	5.04
17.4	51.26	61.35	17.4	11.87	61.14	17.5	21.15	47.97	17.6	28.19	23.80	17.6	55.14	5.21
18.4	51.09	61.71	18.4	11.38	61.53	18.5	21.27	48.36	18.6	28.41	24.11	18.6	55.64	5.42
19.4	50.88	62.04	19.4	10.80	61.90	19.5	21.37	48.75	19.6	28.62	24.43	19.6	56.12	5.63
20.4	50.67	62.36	20.4	10.18	62.25	20.5	21.44	49.13	20.6	28.80	24.77	20.6	56.58	5.86
21.4	50.47	62.64	21.4	9.54	62.57	21.5	21.51	49.50	21.6	28.96	25.08	21.6	56.99	6.08
22.4	50.28	62.91	22.4	8.93	62.87	22.5	21.56	49.84	22.6	29.10	25.38	22.6	57.38	6.30
23.4	50.11	63.17	23.4	8.38	63.16	23.5	21.62	50.15	23.6	29.25	25.64	23.6	57.75	6.49
24.4	49.96	63.42	24.4	7.91	63.45	24.5	21.69	50.44	24.6	29.41	25.90	24.6	58.12	6.66
25.4	49.82	63.67	25.4	7.50	63.73	25.5	21.78	50.74	25.6	29.57	26.14	25.6	58.52	6.81
26.4	49.69	63.95	26.4	7.11	64.04	26.5	21.87	51.04	26.6	29.75	26.37	26.6	58.92	6.95
27.4	49.53	64.25	27.4	6.71	64.36	27.5	21.98	51.35	27.5	29.94	26.62	27.6	59.36	7.12
28.4	49.37	64.56	28.4	6.26	64.70	28.5	22.08	51.69	28.5	30.13	26.90	28.6	59.81	7.30
29.3	49.19	64.87	29.4	5.73	65.05	29.5	22.18	52.05	29.5	30.33	27.21	29.6	60.27	7.50
30.3	48.98	65.18	30.4	5.11	65.39	30.5	22.25	52.44	30.5	30.51	27.53	30.6	60.73	7.73
31.3	48.75	65.48	31.4	4.40	65.73	31.5	22.31	52.82	31.5	30.68	27.87	31.6	61.15	7.99
	13.65	+13.62		49.83	+49.82		12.28	+12.24		11.84	+11.80		20.36	+20.33
	$0^h\ 56^m$	$38^s.823$		$1^h\ 28^m$	$19^s.01$		$4^h\ 8^m$	$52^s.234$		$5^h\ 33^m$	$57^s.736$		$7^h\ 0^m$	$7^s.12$
	+85° 47′	27″.59		+88° 50′	29″.36		+85° 19′	32″.98		+85° 9′	21″.38		+87° 11′	16″.00

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			**α Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Dec.	0 56	+85 48	Dec.	1 28	+88 51	Dec	4 9	+85 19	Dec.	5 34	+85 9	Dec.	7 1	+87 11
	s	″		s	″		s	″		s	″		s	″
1.3	48.75	5.48	1.4	64.40	5.73	1.5	22.31	52.82	1.5	30.68	27.87	1.6	1.15	7.99
2.3	48.50	5.76	2.4	63.63	6.05	2.5	22.33	53.20	2.5	30.82	28.22	2.6	1.55	8.25
3.3	48.25	6.01	3.4	62.81	6.34	3.5	22.35	53.59	3.5	30.94	28.58	3.6	1.92	8.52
4.3	48.01	6.25	4.4	61.99	6.62	4.5	22.35	53.96	4.5	31.04	28.92	4.6	2.26	8.80
5.3	47.77	6.46	5.4	61.19	6.88	5.5	22.34	54.30	5.5	31.14	29.25	5.6	2.57	9.07
6.3	47.53	6.66	6.4	60.40	7.12	6.5	22.33	54.62	6.5	31.23	29.56	6.6	2.86	9.32
7.3	47.32	6.85	7.4	59.66	7.35	7.5	22.32	54.93	7.5	31.32	29.85	7.6	3.15	9.56
8.3	47.11	7.03	8.3	58.95	7.58	8.5	22.32	55.23	8.5	31.40	30.14	8.6	3.45	9.80
9.3	46.92	7.21	9.3	58.29	7.80	9.5	22.33	55.53	9.5	31.50	30.42	9.6	3.74	10.02
10.3	46.73	7.41	10.3	57.64	8.04	10.5	22.35	55.83	10.5	31.61	30.69	10.6	4.04	10.24
11.3	46.52	7.63	11.3	57.00	8.29	11.5	22.37	56.14	11.5	31.72	30.97	11.6	4.35	10.46
12.3	46.31	7.86	12.3	56.34	8.56	12.4	22.40	56.46	12.5	31.85	31.27	12.6	4.69	10.68
13.3	46.09	8.09	13.3	55.64	8.83	13.4	22.42	56.81	13.5	31.97	31.58	13.6	5.04	10.93
14.3	45.85	8.32	14.3	54.86	9.11	14.4	22.43	57.17	14.5	32.09	31.92	14.6	5.40	11.20
15.3	45.58	8.56	15.3	53.99	9.40	15.4	22.43	57.55	15.5	32.19	32.27	15.6	5.75	11.49
16.3	45.29	8.78	16.3	53.04	9.67	16.4	22.40	57.93	16.5	32.28	32.63	16.6	6.07	11.81
17.3	44.99	8.97	17.3	52.03	9.92	17.4	22.35	58.31	17.5	32.34	33.00	17.6	6.35	12.13
18.3	44.69	9.13	18.3	50.99	10.14	18.4	22.29	58.67	18.5	32.38	33.38	18.6	6.60	12.46
19.3	44.41	9.26	19.3	49.98	10.33	19.4	22.21	58.99	19.5	32.41	33.73	19.5	6.82	12.79
20.3	44.14	9.39	20.3	49.03	10.49	20.4	22.13	59.29	20.5	32.43	34.05	20.5	7.01	13.09
21.3	43.91	9.49	21.3	48.14	10.64	21.4	22.06	59.57	21.5	32.45	34.34	21.5	7.19	13.36
22.3	43.68	9.60	22.3	47.33	10.81	22.4	22.00	59.84	22.5	32.49	34.62	22.5	7.37	13.62
23.3	43.47	9.72	23.3	46.57	10.97	23.4	21.96	60.10	23.5	32.53	34.89	23.5	7.57	13.85
24.3	43.25	9.86	24.3	45.81	11.15	24.4	21.93	60.38	24.5	32.58	35.17	24.5	7.80	14.09
25.3	43.00	10.01	25.3	45.02	11.35	25.4	21.90	60.68	25.5	32.65	35.47	25.5	8.05	14.35
26.3	42.75	10.17	26.3	44.17	11.55	26.4	21.86	61.00	26.5	32.70	35.78	26.5	8.31	14.63
27.3	42.48	10.34	27.3	43.24	11.76	27.4	21.81	61.33	27.5	32.76	36.13	27.5	8.56	14.93
28.3	42.18	10.49	28.3	42.23	11.97	28.4	21.73	61.67	28.5	32.79	36.48	28.5	8.79	15.25
29.3	41.88	10.62	29.3	41.15	12.15	29.4	21.63	62.02	29.5	32.81	36.86	29.5	9.00	15.59
30.3	41.56	10.73	30.3	40.03	12.32	30.4	21.51	62.35	30.5	32.81	37.22	30.5	9.18	15.94
31.3	41.24	10.81	31.3	38.89	12.45	31.4	21.38	62.66	31.5	32.79	37.58	31.5	9.32	16.30
32.3	40.94	10.88	32.3	37.77	12.56	32.4	21.24	62.96	32.5	32.75	37.92	32.5	9.43	16.64
	13.66	+13.62		49.94	+49.93		12.29	+12.25		11.85	+11.81		20.37	+20.35
	$0^{h}\ 56^{m}$	$38^{s}.823$		$1^{h}\ 28^{m}$	$19^{s}.01$		$4^{h}\ 8^{m}$	$52^{s}.234$		$5^{h}\ 33^{m}$	$57^{s}.736$		$7^{h}\ 0^{m}$	$7^{s}.12$
	+85° 47′	27″.59		+88° 50′	29″.36		+85° 19′	32″.98		+85° 9′	21″.38		+87° 11′	16″.00

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Jan.	8 13	+88 53	Jan.	9 24	+81 42	Jan.	10 20	+82 59	Jan.	12 14	+88 10	Jan.	15 4	+87 33
	s	″		s	″		s	″		s	″		s	″
0.6	4.79	43.82	0.6	56.31	36.47	0.7	44.74	54.21	0.7	49.37	35.75	0.8	50.26	43.85
1.6	5.35	44.07	1.6	56.42	36.64	1.6	44.90	54.32	1.7	49.99	35.74	1.8	50.58	43.64
2.6	5.92	44.30	2.6	56.53	36.79	2.6	45.06	54.42	2.7	50.58	35.71	2.8	50.90	43.43
3.6	6.53	44.53	3.6	56.65	36.93	3.6	45.23	54.51	3.7	51.19	35.67	3.8	51.21	43.20
4.6	7.19	44.78	4.6	56.78	37.08	4.6	45.40	54.60	4.7	51.85	35.63	4.8	51.53	42.95
5.6	7.88	45.04	5.6	56.92	37.25	5.6	45.57	54.70	5.7	52.55	35.58	5.8	51.89	42.70
6.5	8.58	45.32	6.6	57.06	37.44	6.6	45.75	54.82	6.7	53.29	35.55	6.8	52.28	42.43
7.5	9.26	45.62	7.6	57.19	37.64	7.6	45.94	54.96	7.7	54.06	35.53	7.8	52.68	42.18
8.5	9.90	45.94	8.6	57.33	37.87	8.6	46.13	55.12	8.7	54.85	35.53	8.8	53.13	41.92
9.5	10.48	46.26	9.6	57.46	38.11	9.6	46.31	55.30	9.7	55.64	35.56	9.8	53.61	41.69
10.5	10.98	46.60	10.6	57.59	38.37	10.6	46.49	55.50	10.7	56.42	35.60	10.8	54.10	41.47
11.5	11.41	46.94	11.6	57.70	38.64	11.6	46.65	55.71	11.7	57.19	35.66	11.8	54.59	41.27
12.5	11.77	47.28	12.6	57.80	38.91	12.6	46.81	55.93	12.7	57.91	35.74	12.8	55.08	41.11
13.5	12.06	47.60	13.6	57.90	39.17	13.6	46.96	56.15	13.7	58.60	35.83	13.8	55.57	40.96
14.5	12.32	47.91	14.6	57.99	39.42	14.6	47.09	56.35	14.7	59.24	35.91	14.8	56.02	40.82
15.5	12.55	48.20	15.6	58.07	39.66	15.6	47.22	56.54	15.7	59.85	36.00	15.8	56.44	40.68
16.5	12.79	48.48	16.6	58.15	39.88	16.6	47.34	56.72	16.7	60.43	36.07	16.8	56.84	40.55
17.5	13.08	48.74	17.6	58.23	40.09	17.6	47.46	56.89	17.7	61.01	36.13	17.8	57.22	40.40
18.5	13.43	49.00	18.6	58.32	40.29	18.6	47.59	57.04	18.7	61.60	36.16	18.8	57.60	40.24
19.5	13.84	49.27	19.6	58.42	40.49	19.6	47.73	57.20	19.7	62.25	36.20	19.8	58.00	40.06
20.5	14.28	49.57	20.6	58.53	40.71	20.6	47.88	57.37	20.7	62.94	36.23	20.8	58.42	39.86
21.5	14.72	49.89	21.6	58.65	40.96	21.6	48.04	57.56	21.7	63.67	36.27	21.8	58.89	39.66
22.5	15.12	50.23	22.6	58.75	41.23	22.6	48.20	57.78	22.7	64.42	36.34	22.8	59.40	39.47
23.5	15.43	50.59	23.6	58.85	41.53	23.6	48.36	58.02	23.7	65.18	36.44	23.8	59.94	39.31
24.5	15.64	50.95	24.5	58.94	41.84	24.6	48.51	58.29	24.7	65.91	36.57	24.8	60.49	39.18
25.5	15.74	51.31	25.5	59.01	42.16	25.6	48.63	58.56	25.7	66.61	36.73	25.8	61.05	39.07
26.5	15.74	51.65	26.5	59.07	42.47	26.6	48.74	58.84	26.7	67.24	36.89	26.8	61.58	38.99
27.5	15.69	51.96	27.5	59.12	42.75	27.6	48.84	59.11	27.7	67.81	37.06	27.8	62.08	38.94
28.5	15.63	52.26	28.5	59.17	43.02	28.6	48.93	59.36	28.7	68.34	37.22	28.8	62.55	38.88
29.5	15.59	52.54	29.5	59.21	43.28	29.6	49.01	59.59	29.7	68.85	37.36	29.8	63.00	38.83
30.5	15.59	52.82	30.5	59.25	43.53	30.6	49.10	59.81	30.6	69.35	37.50	30.8	63.43	38.77
31.5	15.62	53.09	31.5	59.31	43.77	31.6	49.19	60.02	31.6	69.88	37.62	31.8	63.86	38.70
32.5	15.69	53.38	32.5	59.37	44.03	32.6	49.29	60.25	32.6	70.45	37.74	32.8	64.32	38.61
	51.94	+51.93		6.94	+6.86		8.20	+8.14		31.43	+31.41		23.50	+23.48
8^h	11^m	$46^s.151$	9^h	24^m	$46^s.516$	10^h	20^m	$34^s.492$	12^h	14^m	$26^s.979$	15^h	4^m	$59^s.30$
+88°	53′	44″.41	+81°	42′	44″.16	+83°	0′	6″.83	+88°	10′	55″.87	+87°	34′	6″.01

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Feb.	8 13	+88 53	Feb.	9 24	+81 42	Feb.	10 20	+83 0	Feb.	12 15	+88 10	Feb	15 5	+87 33
	s	″		s	″		s	″		s	″		s	″
1.5	15.69	53.38	1.5	59.37	44.03	1.6	49.29	0.25	1.6	10.45	37.74	1.8	4.32	38.61
2.5	15.77	53.69	2.5	59.43	44.30	2.6	49.40	0.48	2.6	11.04	37.87	2.8	4.79	38.52
3.5	15.85	54.01	3.5	59.49	44.58	3.6	49.51	0.73	3.6	11.66	38.01	3.8	5.30	38.42
4.5	15.90	54.35	4.5	59.55	44.88	4.6	49.62	1.00	4.6	12.30	38.17	4.8	5.83	38.34
5.5	15.88	54.70	5.5	59.61	45.20	5.6	49.73	1.29	5.6	12.95	38.35	5.8	6.39	38.26
6.5	15.79	55.06	6.5	59.66	45.53	6.6	49.83	1.60	6.6	13.58	38.56	6.7	6.95	38.21
7.5	15.63	55.42	7.5	59.69	45.87	7.5	49.92	1.93	7.6	14.19	38.78	7.7	7.53	38.17
8.5	15.39	55.78	8.5	59.72	46.21	8.5	50.00	2.25	8.6	14.76	39.01	8.7	8.09	38.17
9.5	15.07	56.11	9.5	59.73	46.54	9.5	50.06	2.56	9.6	15.27	39.26	9.7	8.65	38.19
10.5	14.71	56.43	10.5	59.73	46.86	10.5	50.11	2.88	10.6	15.75	39.51	10.7	9.19	38.23
11.4	14.32	56.74	11.5	59.73	47.17	11.5	50.15	3.19	11.6	16.18	39.76	11.7	9.68	38.27
12.4	13.94	57.02	12.5	59.73	47.45	12.5	50.18	3.47	12.6	16.58	39.99	12.7	10.15	38.31
13.4	13.59	57.28	13.5	59.74	47.72	13.5	50.22	3.74	13.6	16.96	40.21	13.7	10.59	38.35
14.4	13.29	57.55	14.5	59.74	47.98	14.5	50.26	3.98	14.6	17.35	40.41	14.7	11.02	38.37
15.4	13.05	57.80	15.5	59.75	48.23	15.5	50.31	4.22	15.6	17.77	40.60	15.7	11.45	38.37
16.4	12.86	58.07	16.5	59.77	48.49	16.5	50.37	4.48	16.6	18.22	40.78	16.7	11.90	38.37
17.4	12.67	58.37	17.5	59.80	48.77	17.5	50.44	4.75	17.6	18.71	40.97	17.7	12.38	38.34
18.4	12.47	58.68	18.5	59.83	49.08	18.5	50.51	5.03	18.6	19.23	41.17	18.7	12.90	38.32
19.4	12.20	59.02	19.5	59.85	49.40	19.5	50.58	5.35	19.6	19.76	41.41	19.7	13.45	38.33
20.4	11.84	59.36	20.5	59.85	49.74	20.5	50.63	5.68	20.6	20.27	41.67	20.7	14.01	38.36
21.4	11.37	59.69	21.5	59.85	50.08	21.5	50.67	6.03	21.6	20.74	41.95	21.7	14.57	38.42
22.4	10.82	60.01	22.5	59.83	50.42	22.5	50.69	6.37	22.6	21.15	42.25	22.7	15.11	38.51
23.4	10.20	60.29	23.5	59.80	50.74	23.5	50.70	6.71	23.6	21.49	42.55	23.7	15.61	38.64
24.4	9.55	60.55	24.5	59.76	51.04	24.5	50.69	7.02	24.6	21.77	42.84	24.7	16.09	38.76
25.4	8.90	60.78	25.5	59.72	51.32	25.5	50.69	7.31	25.6	22.02	43.12	25.7	16.52	38.88
26.4	8.29	61.01	26.5	59.69	51.58	26.5	50.67	7.59	26.6	22.25	43.38	26.7	16.94	39.00
27.4	7.73	61.22	27.5	59.65	51.82	27.5	50.67	7.84	27.6	22.50	43.62	27.7	17.33	39.10
28.4	7.21	61.44	28.5	59.62	52.07	28.5	50.68	8.11	28.6	22.78	43.87	28.7	17.74	39.20
29.4	6.71	61.68	29.4	59.60	52.33	29.5	50.69	8.38	29.6	23.08	44.11	29.7	18.18	39.28
30.4	6.21	61.94	30.4	59.58	52.61	30.5	50.70	8.66	30.6	23.40	44.36	30.7	18.62	39.37
	52.06	+52.05		6.94	+6.87		8.21	+8.15		31.45	+31.43		23.49	+23.47
	$8^{h}\ 11^{m}$	$46^{s}.151$		$9^{h}\ 24^{m}$	$46^{s}.516$		$10^{h}\ 20^{m}$	$34^{s}.492$		$12^{h}\ 14^{m}$	$26^{s}.979$		$15^{h}\ 4^{m}$	$59^{s}.30$
	+88° 53′	44″.41		+81° 42′	44″.16		+83° 0′	6″.83		+88° 10′	55″.87		+87° 34′	6″.01

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Mar.	8 12	+88 54	Mar.	9 24	+81 42	Mar.	10 20	+83 0	Mar.	12 15	+88 10	Mar.	15 5	+87 33
	s	″		s	″		s	″		s	″		s	″
1.4	66.71	1.68	1.4	59.60	52.33	1.5	50.69	8.38	1.6	23.08	44.11	1.7	18.18	39.28
2.4	66.21	1.94	2.4	59.58	52.61	2.5	50.70	8.66	2.6	23.40	44.36	2.7	18.62	39.37
3.4	65.70	2.20	3.4	59.55	52.90	3.5	50.71	8.96	3.6	23.75	44.63	3.7	19.10	39.45
4.4	65.14	2.48	4.4	59.53	53.21	4.5	50.72	9.28	4.6	24.10	44.92	4.7	19.61	39.55
5.4	64.52	2.76	5.4	59.50	53.54	5.5	50.73	9.61	5.6	24.43	45.22	5.7	20.11	39.66
6.4	63.84	3.04	6.4	59.46	53.86	6.5	50.73	9.95	6.6	24.75	45.53	6.7	20.62	39.79
7.4	63.07	3.33	7.4	59.41	54.19	7.5	50.71	10.30	7.6	25.03	45.86	7.7	21.13	39.95
8.4	62.24	3.59	8.4	59.35	54.50	8.5	50.68	10.64	8.5	25.27	46.20	8.7	21.62	40.13
9.4	61.36	3.84	9.4	59.28	54.81	9.5	50.64	10.97	9.5	25.45	46.54	9.7	22.09	40.33
10.4	60.46	4.05	10.4	59.20	55.09	10.5	50.59	11.29	10.5	25.59	46.88	10.7	22.51	40.54
11.4	59.55	4.25	11.4	59.12	55.35	11.5	50.53	11.60	11.5	25.68	47.20	11.7	22.91	40.74
12.4	58.66	4.43	12.4	59.04	55.60	12.5	50.47	11.88	12.5	25.75	47.50	12.7	23.27	40.94
13.4	57.82	4.59	13.4	58.96	55.82	13.5	50.41	12.13	13.5	25.81	47.80	13.7	23.60	41.14
14.4	57.05	4.74	14.4	58.89	56.03	14.5	50.36	12.38	14.5	25.88	48.06	14.7	23.93	41.31
15.4	56.34	4.91	15.4	58.83	56.25	15.5	50.32	12.62	15.5	25.98	48.33	15.6	24.26	41.47
16.4	55.65	5.10	16.4	58.78	56.48	16.4	50.29	12.88	16.5	26.11	48.58	16.6	24.62	41.63
17.4	54.99	5.29	17.4	58.72	56.72	17.4	50.26	13.15	17.5	26.28	48.85	17.6	25.00	41.77
18.4	54.30	5.50	18.4	58.67	56.99	18.4	50.23	13.44	18.5	26.46	49.13	18.6	25.41	41.92
19.4	53.52	5.73	19.4	58.61	57.27	19.4	50.20	13.74	19.5	26.64	49.44	19.6	25.85	42.10
20.3	52.65	5.94	20.4	58.54	57.55	20.4	50.15	14.06	20.5	26.79	49.76	20.6	26.28	42.30
21.3	51.68	6.15	21.4	58.45	57.83	21.4	50.08	14.39	21.5	26.88	50.11	21.6	26.70	42.54
22.3	50.64	6.33	22.4	58.35	58.09	22.4	50.00	14.70	22.5	26.89	50.46	22.6	27.08	42.79
23.3	49.58	6.49	23.4	58.24	58.32	23.4	49.91	14.99	23.5	26.85	50.79	23.6	27.42	43.07
24.3	48.51	6.61	24.4	58.13	58.54	24.4	49.81	15.25	24.5	26.77	51.12	24.6	27.71	43.34
25.3	47.48	6.72	25.4	58.02	58.72	25.4	49.71	15.50	25.5	26.65	51.42	25.6	27.98	43.60
26.3	46.51	6.81	26.4	57.92	58.90	26.4	49.61	15.72	26.5	26.53	51.71	26.6	28.22	43.85
27.3	45.59	6.89	27.4	57.82	59.06	27.4	49.52	15.94	27.5	26.43	51.99	27.6	28.46	44.08
28.3	44.72	6.99	28.4	57.73	59.23	28.4	49.44	16.15	28.5	26.36	52.25	28.6	28.71	44.30
29.3	43.86	7.10	29.4	57.64	59.42	29.4	49.37	16.37	29.5	26.32	52.52	29.6	28.98	44.52
30.3	43.01	7.23	30.4	57.56	59.62	30.4	49.30	16.61	30.5	26.31	52.81	30.6	29.28	44.73
31.3	42.13	7.36	31.4	57.48	59.84	31.4	49.23	16.87	31.5	26.31	53.11	31.6	29.60	44.95
32.3	41.19	7.51	32.4	57.39	60.06	32.4	49.15	17.14	32.5	26.30	53.41	32.6	29.92	45.19
	52.15	+52.15		6.94	+6.87		8.21	+8.15		31.50	+31.47		23.50	+23.48
	$8^h\ 11^m$	$46^s.151$		$9^h\ 24^m$	$46^s.516$		$10^h\ 20^m$	$34^s.492$		$12^h\ 14^m$	$26^s.979$		$15^h\ 4^m$	$59^s.30$
	+88° 53′	44″.41		+81° 42′	44″.16		+83° 0′	6″.83		+88° 10′	55″.87		+87° 34′	6″.01

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Apr.	8 12	+88 54	Apr.	9 24	+81 43	Apr.	10 20	+83 0	Apr.	12 15	+88 10	Apr.	15 5	+87 33
	s	″		s	″		s	″		s	″		s	″
1.3	41.19	7.51	1.4	57.39	0.06	1.4	49.15	17.14	1.5	26.30	53.41	1.6	29.92	45.19
2.3	40.21	7.66	2.4	57.29	0.29	2.4	49.06	17.41	2.5	26.27	53.74	2.6	30.25	45.44
3.3	39.16	7.80	3.4	57.18	0.51	3.4	48.97	17.68	3.5	26.21	54.07	3.6	30.57	45.71
4.3	38.06	7.92	4.4	57.07	0.73	4.4	48.87	17.95	4.5	26.11	54.41	4.6	30.87	46.00
5.3	36.91	8.03	5.4	56.94	0.94	5.4	48.75	18.22	5.5	25.95	54.76	5.6	31.15	46.31
6.3	35.73	8.11	6.4	56.81	1.12	6.4	48.62	18.47	6.5	25.75	55.10	6.6	31.39	46.62
7.3	34.56	8.16	7.3	56.68	1.28	7.4	48.49	18.70	7.5	25.51	55.42	7.6	31.60	46.95
8.3	33.40	8.20	8.3	56.54	1.42	8.4	48.35	18.91	8.5	25.22	55.72	8.6	31.76	47.26
9.3	32.29	8.22	9.3	56.41	1.54	9.4	48.21	19.09	9.5	24.92	56.01	9.6	31.90	47.57
10.3	31.26	8.24	10.3	56.28	1.63	10.4	48.08	19.26	10.5	24.63	56.27	10.6	32.02	47.85
11.3	30.30	8.25	11.3	56.17	1.73	11.4	47.96	19.41	11.5	24.38	56.52	11.6	32.14	48.12
12.3	29.41	8.26	12.3	56.07	1.83	12.4	47.85	19.57	12.5	24.15	56.75	12.6	32.28	48.37
13.3	28.53	8.29	13.3	55.97	1.95	13.4	47.75	19.74	13.5	23.98	56.99	13.6	32.43	48.61
14.3	27.65	8.35	14.3	55.87	2.08	14.4	47.65	19.92	14.4	23.82	57.24	14.6	32.61	48.85
15.3	26.72	8.41	15.3	55.77	2.24	15.4	47.55	20.13	15.4	23.66	57.51	15.6	32.81	49.11
16.3	25.71	8.47	16.3	55.67	2.40	16.4	47.44	20.35	16.4	23.48	57.81	16.6	33.02	49.39
17.3	24.61	8.53	17.3	55.55	2.56	17.4	47.32	20.57	17.4	23.25	58.11	17.6	33.23	49.70
18.3	23.46	8.55	18.3	55.41	2.69	18.4	47.18	20.78	18.4	22.96	58.42	18.6	33.39	50.03
19.3	22.26	8.56	19.3	55.26	2.80	19.4	47.02	20.98	19.4	22.61	58.73	19.6	33.51	50.37
20.3	21.07	8.52	20.3	55.11	2.89	20.4	46.86	21.14	20.4	22.19	59.02	20.5	33.59	50.71
21.3	19.91	8.48	21.3	54.96	2.95	21.3	46.69	21.28	21.4	21.75	59.28	21.5	33.62	51.05
22.3	18.81	8.41	22.3	54.82	2.99	22.3	46.53	21.40	22.4	21.32	59.52	22.5	33.63	51.37
23.3	17.78	8.33	23.3	54.69	3.02	23.3	46.38	21.50	23.4	20.88	59.73	23.5	33.62	51.67
24.3	16.82	8.26	24.3	54.57	3.05	24.3	46.24	21.59	24.4	20.47	59.95	24.5	33.62	51.96
25.2	15.91	8.20	25.3	54.45	3.09	25.3	46.10	21.68	25.4	20.10	60.15	25.5	33.64	52.23
26.2	15.00	8.16	26.3	54.34	3.14	26.3	45.97	21.80	26.4	19.76	60.36	26.5	33.68	52.50
27.2	14.09	8.13	27.3	54.22	3.20	27.3	45.84	21.92	27.4	19.44	60.59	27.5	33.74	52.76
28.2	13.15	8.10	28.3	54.11	3.28	28.3	45.72	22.05	28.4	19.12	60.82	28.5	33.82	53.04
29.2	12.16	8.08	29.3	53.98	3.36	29.3	45.60	22.19	29.4	18.79	61.06	29.5	33.90	53.32
30.2	11.13	8.06	30.3	53.85	3.44	30.3	45.46	22.34	30.4	18.44	61.32	30.5	33.98	53.63
31.2	10.04	8.03	31.3	53.72	3.51	31.3	45.31	22.49	31.4	18.06	61.57	31.5	34.05	53.96
52.20	+52.19		6.94	+6.87		8.21	+8.15		31.53	+31.52		23.52	+23.50	
$8^h\ 11^m$	$46^s.151$		$9^h\ 24^m$	$46^s.516$		$10^h\ 20^m$	$34^s.492$		$12^h\ 14^m$	$26^s.979$		$15^h\ 4^m$	$59^s.30$	
+88° 53′	44″.41		+81° 42′	44″.16		+83° 0′	6″.83		+88° 10′	55″.87		+87° 34′	6″.01	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 5.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
May	8 11	+88 54	May	9 24	+81 43	May	10 20	+83 0	May	12 15	+88 11	May	15 5	+87 33
	s	″		s	″		s	″		s	″		s	″
1.2	70.04	8.03	1.3	53.72	3.51	1.3	45.31	22.49	1.4	18.06	1.57	1.5	34.05	53.96
2.2	68.92	7.98	2.3	53.58	3.56	2.3	45.15	22.63	2.4	17.62	1.83	2.5	34.08	54.30
3.2	67.77	7.90	3.3	53.43	3.61	3.3	44.99	22.75	3.4	17.15	2.09	3.5	34.09	54.64
4.2	66.63	7.80	4.3	53.27	3.63	4.3	44.82	22.85	4.4	16.63	2.33	4.5	34.05	54.99
5.2	65.51	7.68	5.3	53.12	3.63	5.3	44.65	22.92	5.4	16.07	2.55	5.5	33.98	55.34
6.2	64.44	7.54	6.3	52.98	3.60	6.3	44.47	22.97	6.4	15.50	2.75	6.5	33.87	55.68
7.2	63.46	7.38	7.3	52.84	3.56	7.3	44.29	23.00	7.4	14.93	2.92	7.5	33.74	55.99
8.2	62.54	7.22	8.3	52.70	3.50	8.3	44.14	23.02	8.4	14.39	3.07	8.5	33.60	56.29
9.2	61.71	7.07	9.3	52.58	3.44	9.3	43.99	23.03	9.4	13.88	3.21	9.5	33.46	56.56
10.2	60.91	6.93	10.3	52.47	3.40	10.3	43.85	23.05	10.4	13.40	3.34	10.5	33.36	56.81
11.2	60.14	6.82	11.3	52.37	3.37	11.3	43.72	23.09	11.4	12.96	3.49	11.5	33.28	57.06
12.2	59.34	6.71	12.3	52.26	3.37	12.3	43.60	23.14	12.4	12.55	3.65	12.5	33.23	57.31
13.2	58.50	6.62	13.3	52.15	3.36	13.3	43.47	23.21	13.4	12.13	3.82	13.5	33.19	57.59
14.2	57.57	6.52	14.2	52.03	3.37	14.3	43.33	23.28	14.4	11.68	4.01	14.5	33.14	57.89
15.2	56.59	6.41	15.2	51.89	3.36	15.3	43.17	23.35	15.4	11.17	4.21	15.5	33.06	58.20
16.2	55.55	6.26	16.2	51.75	3.33	16.3	42.99	23.40	16.4	10.60	4.40	16.5	32.95	58.53
17.2	54.51	6.09	17.2	51.60	3.28	17.3	42.81	23.43	17.4	9.98	4.58	17.5	32.79	58.86
18.2	53.51	5.89	18.2	51.45	3.20	18.3	42.62	23.43	18.4	9.32	4.74	18.5	32.59	59.20
19.2	52.57	5.67	19.2	51.31	3.10	19.3	42.45	23.40	19.4	8.65	4 87	19.5	32.36	59.51
20.2	51.72	5.44	20.2	51.18	2.97	20.3	42.28	23.35	20.3	7.98	4.97	20.5	32.10	59.80
21.2	50.94	5.22	21.2	51.06	2.84	21.3	42.12	23.29	21.3	7.35	5.06	21.5	31.86	60.07
22.2	50.22	5.00	22.2	50.94	2.72	22.3	41.97	23.23	22.3	6.76	5.13	22.5	31.62	60.32
23.2	49.55	4.81	23.2	50.84	2.61	23.3	41.83	23.19	23.3	6.20	5.21	23.5	31.40	60.56
24.2	48.89	4.62	24.2	50.74	2.51	24.3	41.70	23.15	24.3	5.68	5.29	24.5	31.21	60.80
25.2	48.20	4.44	25.2	50.64	2.43	25.3	41.56	23.12	25.3	5.16	5.40	25.5	31.02	61.05
26.2	47.48	4.28	26.2	50.53	2.36	26.3	41.43	23.11	26.3	4.65	5.50	26.5	30.85	61.30
27.2	46.72	4.12	27.2	50.42	2.28	27.3	41.28	23.09	27.3	4.12	5.62	27.4	30.68	61.56
28.2	45.92	3.95	28.2	50.30	2.21	28.2	41.13	23.09	28.3	3.57	5.74	28.4	30.50	61.84
29.2	45.08	3.76	29.2	50.18	2.13	29.2	40.97	23.07	29.3	2.97	5.86	29.4	30.31	62.13
30.2	44.22	3.56	30.2	50.05	2.03	30.2	40.81	23.04	30.3	2.33	5.98	30.4	30.08	62.43
31.2	43.36	3.32	31.2	49.92	1.91	31.2	40.64	23.00	31.3	1.67	6.09	31.4	29.82	62.73
32.1	42.52	3.07	32.2	49.79	1.76	32.2	40.46	22.92	32.3	0.96	6.18	32.4	29.53	63.04
	52.17	+52.17		6.94	+6.87		8.21	+8.15		31.56	+31.55		23.55	+23.53
	8h 11m	46s.151		9h 24m	46s.516		10h 20m	34s.492		12h 14m	26s.979		15h 4m	59s.30
	+88° 53′	44″.41		+81° 42′	44″.16		+83° 0′	6″.83		+88° 10′	55″.87		+87° 34′	6″.01

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
June	8 11	+88 53	June	9 24	+81 42	June	10 20	+83 0	June	12 14	+88 11	June	15 5	+87 34
	s	″		s	″		s	″		s	″		s	″
1.1	42.52	63.07	1.2	49.79	61.76	1.2	40.46	22.92	1.3	60.96	6.18	1.4	29.53	3.04
2.1	41.73	62.81	2.2	49.66	61.59	2.2	40.29	22.82	2.3	60.23	6.25	2.4	29.20	3.32
3.1	41.02	62.53	3.2	49.54	61.41	3.2	40.12	22.70	3.3	59.50	6.30	3.4	28.84	3.59
4.1	40.41	62.24	4.2	49.43	61.20	4.2	39.96	22.57	4.3	58.80	6.31	4.4	28.47	3.83
5.1	39.88	61.96	5.2	49.33	61.00	5.2	39.82	22.42	5.3	58.13	6.32	5.4	28.11	4.04
6.1	39.44	61.69	6.2	49.24	60.79	6.2	39.69	22.28	6.3	57.51	6.31	6.4	27.76	4.23
7.1	39.02	61.45	7.2	49.16	60.62	7.2	39.57	22.15	7.3	56.94	6.30	7.4	27.44	4.41
8.1	38.59	61.22	8.2	49.08	60.46	8.2	39.46	22.04	8.3	56.39	6.30	8.4	27.15	4.59
9.1	38.13	61.00	9.2	49.00	60.31	9.2	39.35	21.95	9.3	55.85	6.32	9.4	26.89	4.79
10.1	37.59	60.79	10.2	48.91	60.18	10.2	39.22	21.86	10.3	55.29	6.35	10.4	26.61	5.00
11.1	36.98	60.57	11.2	48.81	60.04	11.2	39.08	21.78	11.3	54.70	6.40	11.4	26.33	5.23
12.1	36.34	60.32	12.2	48.70	59.88	12.2	38.93	21.69	12.3	54.05	6.44	12.4	26.03	5.49
13.1	35.68	60.04	13.2	48.59	59.70	13.2	38.77	21.58	13.3	53.34	6.48	13.4	25.67	5.74
14.1	35.04	59.73	14.2	48.47	59.49	14.2	38.60	21.43	14.3	52.59	6.50	14.4	25.28	6.00
15.1	34.46	59.41	15.2	48.36	59.26	15.2	38.44	21.25	15.3	51.82	6.49	15.4	24.85	6.24
16.1	33.99	59.08	16.2	48.26	59.00	16.2	38.28	21.06	16.3	51.08	6.45	16.4	24.39	6.46
17.1	33.58	58.74	17.2	48.17	58.73	17.2	38.14	20.85	17.3	50.36	6.39	17.4	23.93	6.66
18.1	33.25	58.42	18.2	48.10	58.47	18.2	38.02	20.65	18.3	49.68	6.31	18.4	23.47	6.82
19.1	32.99	58.12	19.1	48.03	58.22	19.2	37.90	20.45	19.3	49.03	6.24	19.4	23.05	6.98
20.1	32.74	57.82	20.1	47.97	57.99	20.2	37.79	20.27	20.3	48.43	6.17	20.4	22.64	7.12
21.1	32.50	57.55	21.1	47.91	57.77	21.2	37.68	20.09	21.3	47.86	6.10	21.4	22.26	7.26
22.1	32.22	57.28	22.1	47.85	57.55	22.2	37.57	19.93	22.3	47.30	6.04	22.4	21.89	7.41
23.1	31.90	57.02	23.1	47.77	57.35	23.2	37.47	19.77	23.3	46.72	6.00	23.4	21.54	7.57
24.1	31.57	56.77	24.1	47.71	57.16	24.2	37 35	19.62	24.3	46.14	5.96	24.4	21.19	7.74
25.1	31.19	56.49	25.1	47.63	56.96	25.2	37.23	19.46	25.3	45.52	5.93	25.4	20.82	7.93
26.1	30.80	56.21	26.1	47.55	56.74	26.2	37.10	19.30	26.2	44.87	5.90	26.4	20.42	8.12
27.1	30.39	55.90	27.1	47.46	56.50	27.2	36.96	19.12	27.2	44.18	5.86	27.4	20.00	8.31
28.1	29.99	55.57	28.1	47.37	56.24	28.2	36.83	18.92	28.2	43.46	5.80	28.4	19.54	8.51
29.1	29.63	55.23	29.1	47.28	55.95	29.2	36.70	18.69	29.2	42.73	5.72	29.4	19.04	8.69
30.1	29.34	54.87	30.1	47.21	55.67	30.2	36.57	18.44	30.2	41.99	5.61	30.4	18.52	8.85
31.1	29.15	54.50	31.1	47.14	55.35	31.2	36.44	18.18	31.2	41.27	5.48	31.4	17.99	8.98
	52.08	+52.07		6.94	+6.87		8.21	+8.15		31.58	+31.56		23.57	+23.55
	8^h 11^m	$46^s.151$		9^h 24^m	$46^s.516$		10^h 20^m	$34^s.492$		12^h 14^m	$26^s.979$		15^h 4^m	$59^s.30$
	+88° 53′	44″.41		+81° 42′	44″.16		+83° 0′	6″.83		+88° 10′	55″.87		+87° 34′	6″.01

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
July	8 11	+88 53	July	9 24	+81 42	July	10 20	+83 0	July	12 14	+88 10	July	15 5	+87 34
	s	″		s	″		s	″		s	″		s	″
1.1	29.15	54.50	1.1	47.14	55.35	1.2	36.44	18.18	1.2	41.27	65.48	1.4	17.99	8.98
2.1	29.08	54.14	2.1	47.08	55.04	2.2	36.33	17.90	2.2	40.59	65.32	2.3	17.45	9.10
3.1	29.06	53.79	3.1	47.04	54.73	3.1	36.25	17.62	3.2	39.95	65.17	3.3	16.93	9.19
4.1	29.11	53.46	4.1	47.01	54.44	4.1	36.17	17.35	4.2	39.37	65.00	4.3	16.43	9.26
5.1	29.20	53.15	5.1	46.98	54.17	5.1	36.09	17.10	5.2	38.83	64.85	5.3	15.97	9.32
6.1	29.25	52.85	6.1	46.96	53.91	6.1	36.02	16.87	6.2	38.32	64.71	6.3	15.53	9.39
7.0	29.23	52.57	7.1	46.92	53.66	7.1	35.95	16.65	7.2	37.78	64.58	7.3	15.11	9.48
8.0	29.15	52.29	8.1	46.87	53.41	8.1	35.86	16.44	8.2	37.22	64.47	8.3	14.70	9.58
9.0	29.00	52.00	9.1	46.82	53.15	9.1	35.76	16.23	9.2	36.62	64.36	9.3	14.25	9.70
10.0	28.81	51.67	10.1	46.76	52.88	10.1	35.65	16.00	10.2	35.98	64.26	10.3	13.78	9.83
11.0	28.64	51.32	11.1	46.70	52.59	11.1	35.53	15.74	11.2	35.30	64.13	11.3	13.25	9.96
12.0	28.52	50.95	12.1	46.64	52.25	12.1	35.42	15.45	12.2	34.58	63.98	12.3	12.69	10.08
13.0	28.49	50.56	13.1	46.59	51.92	13.1	35.31	15.14	13.2	33.87	63.80	13.3	12.09	10.19
14.0	28.56	50.17	14.1	46.55	51.57	14.1	35.21	14.82	14.2	33.18	63.59	14.3	11.51	10.26
15.0	28.73	49.79	15.1	46.52	51.22	15.1	35.13	14.50	15.2	32.54	63.37	15.3	10.94	10.32
16.0	28.95	49.42	16.1	46.51	50.88	16.1	35.06	14.17	16.2	31.95	63.15	16.3	10.38	10.35
17.0	29.20	49.08	17.1	46.49	50.56	17.1	35.00	13.86	17.2	31.40	62.93	17.3	9.86	10.37
18.0	29.45	48.76	18.1	46.49	50.24	18.1	34.95	13.57	18.2	30.90	62.72	18.3	9.36	10.38
19.0	29.68	48.45	19.1	46.49	49.95	19.1	34.90	13.29	19.2	30.42	62.51	19.3	8.88	10.39
20.0	29.87	48.15	20.1	46.48	49.66	20.1	34.85	13.02	20.2	29.94	62.33	20.3	8.41	10.41
21.0	30.04	47.85	21.1	46.46	49.38	21.1	34.79	12.76	21.2	29.45	62.15	21.3	7.94	10.45
22.0	30.17	47.54	22.1	46.44	49.11	22.1	34.73	12.50	22.2	28.93	61.97	22.3	7.47	10.49
23.0	30.28	47.23	23.1	46.42	48.83	23.1	34.66	12.23	23.2	28.38	61.79	23.3	6.98	10.54
24.0	30.38	46.90	24.1	46.39	48.52	24.1	34.59	11.95	24.2	27.81	61.62	24.3	6.47	10.60
25.0	30.49	46.56	25.1	46.36	48.20	25.1	34.51	11.66	25.2	27.20	61.43	25.3	5.93	10.67
25.9	30.62	46.20	26.0	46.33	47.85	26.1	34.43	11.34	26.2	26.58	61.22	26.3	5.36	10.72
26.9	30.81	45.81	27.0	46.31	47.49	27.1	34.36	11.00	27.2	25.94	60.99	27.3	4.75	10.75
27.9	31.08	45.43	28.0	46.30	47.13	28.1	34.29	10.64	28.2	25.32	60.73	28.3	4.14	10.77
28.9	31.45	45.04	29.0	46.31	46.75	29.1	34.24	10.28	29.2	24.74	60.45	29.3	3.52	10.75
29.9	31.91	44.67	30.0	46.32	46.36	30.1	34.20	9.91	30.2	24.21	60.16	30.3	2.91	10.70
30.9	32.44	44.31	31.0	46.35	45.99	31.1	34.17	9.54	31.2	23.72	59.86	31.3	2.33	10.64
31.9	33.01	43.97	32.0	46.38	45.65	32.1	34.16	9.19	32.1	23.28	59.55	32.3	1.78	10.56
	51.96	+51.95		6.94	+6.87		8.21	+8.15		31.56	+31.54		23.58	+23.56
	$8^h\ 11^m$	$46^s.151$		$9^h\ 24^m$	$46^s.516$		$10^h\ 20^m$	$34^s.492$		$12^h\ 14^m$	$26^s.979$		$15^h\ 4^m$	$59^s.30$
	+88° 53′	44″.41		+81° 42′	44″.16		+83° 0′	6″.83		+88° 10′	55″.87		+87° 34′	6″.01

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Aug	8 11	+88 53	Aug.	9 24	+81 42	Aug.	10 20	+82 59	Aug.	12 14	+88 10	Aug.	15 4	+87 34
	s	″		s	″		s	″		s	″		s	″
1.9	33.57	43.66	1.0	46.38	45.65	1.1	34.16	69.19	1.1	23.28	59.55	1.3	61.78	10.56
2.9	34.09	43.38	2.0	46.41	45.33	2.1	34.15	68.86	2.1	22.89	59.28	2.3	61.27	10.49
3.9	34.55	43.10	3.0	46.44	45.03	3.1	34.14	68.55	3.1	22.51	59.00	3.3	60.78	10.42
4.9	34.95	42.80	4.0	46.46	44.73	4.1	34.13	68.25	4.1	22.11	58.76	4.3	60.31	10.38
5.9	35.29	42.48	5.0	46.47	44.42	5.1	34.10	67.95	5.1	21.67	58.53	5.3	59.81	10.35
6.9	35.61	42.15	6.0	46.48	44.10	6.1	34.05	67.65	6.1	21.18	58.29	6.3	59.29	10.34
7.9	35.95	41.79	7.0	46.48	43.77	7.1	34.00	67.32	7.1	20.66	58.04	7.3	58.73	10.33
8.9	36.36	41.42	8.0	46.48	43.42	8.1	33.95	66.97	8.1	20.11	57.77	8.2	58.14	10.32
9.9	36.85	41.04	9.0	46.49	43.04	9.0	33.91	66.60	9.1	19.54	57.48	9.2	57.52	10.30
10.9	37.44	40.66	10.0	46.51	42.65	10.0	33.88	66.22	10.1	19.01	57.17	10.2	56.89	10.24
11.9	38.12	40.29	11.0	46.54	42.25	11.0	33.85	65.82	11.1	18.50	56.84	11.2	56.26	10.16
12.9	38.86	39.96	12.0	46.58	41.86	12.0	33.84	65.43	12.1	18.07	56.50	12.2	55.66	10.05
13.9	39.61	39.63	12.9	46.62	41.49	13.0	33.85	65.04	13.1	17.67	56.15	13.2	55.09	9.92
14.9	40.35	39.34	13.9	46.68	41.14	14.0	33.86	64.67	14.1	17.33	55.81	14.2	54.55	9.79
15.9	41.05	39.05	14.9	46.74	40.80	15.0	33.87	64.32	15.1	17.00	55.49	15.2	54.03	9.66
16.9	41.70	38.78	15.9	46.79	40.48	16.0	33.89	63.99	16.1	16.69	55.18	16.2	53.53	9.53
17.9	42.32	38.50	16.9	46.84	40.18	17.0	33.90	63.67	17.1	16.38	54.88	17.2	53.04	9.42
18.9	42.90	38.21	17.9	46.88	39.87	18.0	33.92	63.35	18.1	16.06	54.59	18.2	52.56	9.32
19.9	43.45	37.92	18.9	46.92	39.56	19.0	33.93	63.04	19.1	15.71	54.31	19.2	52.08	9.24
20.9	44.01	37.60	19.9	46.96	39.24	20.0	33.92	62.71	20.1	15.32	54.03	20.2	51.56	9.16
21.9	44.60	37.28	20.9	46.99	38.91	21.0	33.91	62.37	21.1	14.93	53.74	21.2	51.02	9.08
22.9	45.24	36.94	21.9	47.02	38.56	22.0	33.90	62.00	22.1	14.50	53.43	22.2	50.45	9.00
23.9	45.93	36.59	22.9	47.06	38.19	23.0	33.88	61.63	23.1	14.07	53.10	23.2	49.87	8.91
24.9	46.70	36.24	23.9	47.11	37.81	24.0	33.88	61.24	24.1	13.64	52.75	24.2	49.27	8.79
25.9	47.56	35.90	24.9	47.16	37.42	25.0	33.89	60.84	25.1	13.24	52.38	25.2	48.66	8.65
26.9	48.51	35.57	25.9	47.23	37.03	26.0	33.91	60.43	26.1	12.90	52.00	26.2	48.06	8.47
27.9	49.50	35.27	26.9	47.31	36.65	26.9	33.96	60.01	27.1	12.60	51.60	27.2	47.48	8.28
28.9	50.51	34.99	27.9	47.40	36.29	27.9	34.01	59.61	28.1	12.34	51.21	28.2	46.94	8.07
29.9	51.48	34.74	28.9	47.50	35.95	28.9	34.07	59.24	29.1	12.15	50.83	29.2	46.44	7.86
30.9	52.40	34.50	29.9	47.59	35.63	29.9	34.14	58.88	30.1	11.98	50.47	30.2	45.96	7.65
31.9	53.25	34.25	30.9	47.67	35.33	30.9	34.20	58.54	31.1	11.82	50.12	31.2	45.49	7.46
32.9	54.03	34.00	31.9	47.75	35.02	31.9	34.25	58.22	32.1	11.62	49.78	32.2	45.04	7.30
	51.82	+51.81		6.94	+6.86		8.21	+8.15		31.52	+31.51		23.58	+23.56
	$8^h\ 11^m\ 46^s.151$			$9^h\ 24^m\ 46^s.516$			$10^h\ 20^m\ 34^s.492$			$12^h\ 14^m\ 26^s.979$			$15^h\ 4^m\ 59^s.30$	
	+88° 53′ 44″.41			+81° 42′ 44″.16			+83° 0′ 6″.83			+88° 10′ 55″.87			+87° 34′ 6″.01	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Sept.	8 11	+88 53	Sept.	9 24	+81 42	Sept.	10 20	+82 59	Sept.	12 14	+88 10	Sept.	15 4	+87 33
	s	″		s	″		s	″		s	″		s	″
1.9	54.03	34.00	1.9	47.83	34.72	1.9	34.28	57.89	1.1	11.62	49.78	1.2	45.04	67.30
2.9	54.78	33.72	2.9	47.89	34.40	2.9	34.32	57.54	2.1	11.38	49.46	2.2	44.57	67.13
3.9	55.53	33.43	3.9	47.95	34.05	3.9	34.34	57.18	3.1	11.10	49.13	3.2	44.05	66.98
4.9	56.34	33.11	4.9	48.01	33.68	4.9	34.36	56.80	4.1	10.78	48.79	4.2	43.51	66.84
5.9	57.23	32.78	5.9	48.08	33.30	5.9	34.39	56.39	5.1	10.45	48.42	5.2	42.94	66.67
6.9	58.21	32.46	6.9	48.17	32.91	6.9	34.43	55.97	6.1	10.12	48.03	6.2	42.36	66.50
7.9	59.26	32.15	7.9	48.26	32.54	7.9	34.49	55.56	7.0	9.83	47.64	7.2	41.77	66.29
8.9	60.38	31.86	8.9	48.37	32.18	8.9	34.56	55.16	8.0	9.60	47.22	8.2	41.21	66.06
9.9	61.51	31.60	9.9	48.48	31.83	9.9	34.64	54.77	9.0	9.42	46.81	9.2	40.68	65.82
10.9	62.63	31.36	10.9	48.60	31.52	10.9	34.72	54.39	10.0	9.29	46.40	10.2	40.18	65.56
11.9	63.73	31.15	11.9	48.71	31.22	11.9	34.81	54.05	11.0	9.22	46.00	11.2	39.72	65.30
12.9	64.78	30.94	12.9	48.82	30.93	12.9	34.90	53.72	12.0	9.16	45.62	12.2	39.28	65.05
13.9	65.79	30.74	13.9	48.92	30.65	13.9	34.98	53.40	13.0	9.10	45.27	13.1	38.86	64.80
14.9	66.76	30.54	14.9	49.02	30.37	14.9	35.05	53.08	14.0	9.03	44.91	14.1	38.45	64.58
15.9	67.70	30.32	15.9	49.12	30.09	15.9	35.12	52.75	15.0	8.93	44.57	15.1	38.03	64.36
16.9	68.62	30.09	16.9	49.21	29.79	16.9	35.18	52.42	16.0	8.81	44.23	16.1	37.61	64.15
17.9	69.56	29.84	17.9	49.30	29.47	17.9	35.24	52.07	17.0	8.67	43.88	17.1	37.16	63.94
18.8	70.51	29.58	18.9	49.39	29.15	18.9	35.30	51.72	18.0	8.51	43.53	18.1	36.69	63.74
19.8	71.52	29.31	19.9	49.48	28.81	19.9	35.37	51.34	19.0	8.32	43.16	19.1	36.20	63.53
20.8	72.61	29.04	20.9	49.59	28.46	20.9	35.45	50.94	20.0	8.15	42.77	20.1	35.70	63.30
21.8	73.78	28.79	21.9	49.71	28.11	21.9	35.54	50.54	21.0	7.99	42.35	21.1	35.18	63.05
22.8	75.03	28.54	22.9	49.84	27.77	22.9	35.64	50.14	22.0	7.88	41.93	22.1	34.66	62.77
23.8	76.34	28.32	23.9	49.98	27.45	23.9	35.76	49.75	23.0	7.82	41.50	23.1	34.16	62.46
24.8	77.65	28.12	24.9	50.13	27.15	24.9	35.89	49.39	24.0	7.82	41.06	24.1	33.71	62.14
25.8	78.95	27.94	25.9	50.27	26.87	25.9	36.02	49.04	24.9	7.87	40.64	25.1	33.29	61.81
26.8	80.21	27.79	26.9	50.42	26.61	26.9	36.14	48.72	25.9	7.96	40.22	26.1	32.91	61.49
27.8	81.41	27.63	27.9	50.55	26.36	27.9	36.26	48.42	26.9	8.06	39.83	27.1	32.57	61.17
28.8	82.52	27.48	28.9	50.68	26.11	28.9	36.37	48.11	27.9	8.15	39.47	28.1	32.24	60.88
29.8	83.58	27.31	29.9	50.80	25.84	29.9	36.47	47.80	28.9	8.20	39.12	29.1	31.88	60.61
30.8	84.63	27.12	30.9	50.90	25.56	30.9	36.56	47.47	29.9	8.18	38.77	30.1	31.50	60.36
31.8	85.70	26.91	31.9	51.02	25.27	31.9	36.65	47.13	30.9	8.15	38.40	31.1	31.08	60.10
32.8	86.84	26.68	32.9	51.15	24.96	32.9	36.75	46.77	31.9	8.09	38.02	32.1	30.65	59.84
	51.70	+51.69		6.93	+6.86		8.20	+8.14		31.47	+31.45		23.56	+23.54
	8^h 11^m	$46^s.151$		9^h 24^m	$46^s.516$		10^h 20^m	$34^s.492$		12^h 14^m	$26^s.979$		15^h 4^m	$59^s.30$
	+88° 53′	44″.41		+81° 42′	44″.16		+83° 0′	6″.83		+88° 10′	55″.87		+87° 34′	6″.01

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Oct.	8 12	+88 53	Oct.	9 24	+81 42	Oct.	10 20	+82 59	Oct.	12 14	+88 10	Oct.	15 4	+87 33
	s	″		s	″		s	″		s	″		s	″
1.8	25.70	26.91	1.9	51.02	25.27	1.9	36.65	47.13	1.9	8.09	38.02	1.1	31.08	60.10
2.8	26.84	26.68	2.9	51.15	24.96	2.9	36.75	46.77	2.9	8.02	37.63	2.1	30.65	59.84
3.8	28.05	26.46	3.9	51.27	24.63	3.9	36.85	46.39	3.9	7.99	37.21	3.1	30.19	59.57
4.8	29.35	26.25	4.9	51.41	24.31	4.9	36.97	46.01	4.9	8.01	36.78	4.1	29.72	59.26
5.8	30.71	26.06	5.9	51.56	24.00	5.9	37.11	45.64	5.9	8.08	36.34	5.1	29.28	58.93
6.8	32.10	25.90	6.8	51.72	23.72	6.9	37.25	45.28	6.9	8.22	35.91	6.1	28.88	58.60
7.8	33.49	25.76	7.8	51.88	23.46	7.9	37.41	44.95	7.9	8.39	35.49	7.1	28.51	58.24
8.8	34.86	25.64	8.8	52.05	23.22	8.9	37.56	44.65	8.9	8.59	35.10	8.1	28.19	57.88
9.8	36.17	25.53	9.8	52.20	23.00	9.9	37.71	44.35	9.9	8.81	34.72	9.1	27.88	57.52
10.8	37.43	25.44	10.8	52.35	22.79	10.9	37.86	44.07	10.9	9.02	34.34	10.1	27.60	57.17
11.8	38.64	25.34	11 8	52.50	22.59	11.9	38.00	43.81	11.9	9.23	33.99	11.1	27.34	56.84
12.8	39.81	25.24	12.8	52.64	22.39	12.9	38.14	43.54	12.9	9.39	33.65	12.1	27.08	56.52
13.8	40.96	25.12	13.8	52.78	22.17	13.9	38.26	43.27	13.9	9.53	33.30	13.1	26.81	56.21
14.8	42.10	25.00	14.8	52.92	21.94	14.9	38.38	42.99	14.9	9.65	32.94	14.1	26.53	55.91
15.8	43.25	24.86	15.8	53.05	21.71	15.9	38.51	42.70	15.9	9.76	32.59	15.1	26.22	55.61
16.8	44.44	24.71	16.8	53.19	21.46	16.9	38.64	42.39	16.9	9.86	32.22	16.1	25.89	55.31
17.8	45.69	24.56	17.8	53.34	21.20	17.9	38.77	42.07	17.9	9.98	31.83	17.1	25.55	55.01
18.8	47.01	24.42	18.8	53.50	20.94	18.9	38.91	41.74	18.9	10.14	31.42	18.1	25.20	54.69
19.8	48.41	24.28	19.8	53.67	20.68	19.9	39.07	41.41	19.9	10.34	31.00	19.1	24.85	54.33
20.8	49.86	24.18	20.8	53.84	20.44	20.8	39.24	41.09	20.9	10.59	30.57	20.0	24.52	53.95
21.8	51.34	24.10	21.8	54.02	20.22	21.8	39.43	40.79	21.9	10.90	30.16	21.0	24.23	53.56
22.8	52.80	24.04	22.8	54.21	20.04	22.8	39.62	40.52	22.9	11.26	29.77	22.0	23.99	53.17
23.8	54.22	24.02	23.8	54.39	19.87	23.8	39.80	40.26	23.9	11.64	29.40	23.0	23.77	52.77
24.7	55.58	24.00	24.8	54.56	19.71	24.8	39.98	40.03	24.9	12.02	29.05	24.0	23.59	52.37
25.7	56.86	23.98	25.8	54.73	19.57	25.8	40.16	39.82	25.9	12.36	28.72	25.0	23.44	52.00
26.7	58.06	23.93	26.8	54.88	19.42	26.8	40.32	39.59	26.9	12.65	28.41	26.0	23.31	51.66
27.7	59.23	23.87	27.8	55.03	19.24	27.8	40.47	39.36	27.9	12.91	28.09	27.0	23.12	51.33
28.7	60.42	23.79	28.8	55.18	19.06	28.8	40.61	39.11	28.9	13.13	27.75	28.0	22.92	51.01
29.7	61.65	23.72	29.8	55.33	18.86	29.8	40.76	38.84	29.9	13.35	27.39	29.0	22.68	50.69
30.7	62.94	23.62	30.8	55.49	18.64	30.8	40.92	38.55	30.9	13.58	27.03	30.0	22.42	50.35
31.7	64.30	23.53	31.8	55.66	18.43	31.8	41.09	38.26	31.9	13.84	26.64	31.0	22.16	49.99
32.7	65.73	23.46	32.8	55.84	18.24	32.8	41.27	37.98	32.9	14.18	26.24	32.0	21.91	49.62
	51.63	+51.62		6.93	+6.86		8.20	+8.14		31.41	+31.40		23.54	+23.52
	$8^h\ 11^m$	$46^s.151$		$9^h\ 24^m$	$46^s.516$		$10^h\ 20^m$	$34^s.492$		$12^h\ 14^m$	$26^s.979$		$15^h\ 4^m$	$59^s.30$
	+88° 53′	44″.41		+81° 42′	44″.16		+83° 0′	6″.83		+88° 10′	55″.87		+87° 34′	6″.01

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Nov.	8 13	+88 53	Nov.	9 24	+81 42	Nov.	10 20	+82 59	Nov.	12 14	+88 10	Nov.	15 4	+87 33
	s	″		s	″		s	″		s	″		s	″
1.7	5.73	23.46	1.8	55.84	18.24	1.8	41.27	37.98	1.9	14.18	26.24	1.0	21.91	49.62
2.7	7.19	23.43	2.8	56.03	18.06	2.8	41.47	37.71	2.9	14.55	25.86	2.0	21.68	49.22
3.7	8.66	23.42	3.8	56.22	17.91	3.8	41.67	37.47	3.9	14.98	25.49	3.0	21.51	48.81
4.7	10.11	23.42	4.8	56.42	17.78	4.8	41.88	37.25	4.9	15.46	25.13	4.0	21.35	48.39
5.7	11.50	23.45	5.8	56.61	17.67	5.8	42.08	37.05	5.9	15.96	24.79	5.0	21.25	47.99
6.7	12.84	23.49	6.8	56.79	17.58	6.8	42.27	36.88	6.9	16.44	24.48	6.0	21.17	47.58
7.7	14.11	23.53	7.8	56.97	17.50	7.8	42.46	36.71	7.9	16.91	24.19	6.9	21.12	47.20
8.7	15.33	23.57	8.8	57.14	17.42	8.8	42.65	36.56	8.9	17.36	23.90	7.9	21.08	46.82
9.7	16.50	23.60	9.8	57.31	17.33	9.8	42.82	36.40	9.9	17.79	23.63	8.9	21.03	46.47
10.7	17.66	23.63	10.8	57.47	17.23	10.8	42.99	36.23	10.9	18.18	23.34	9.9	20.97	46.13
11.7	18.81	23.64	11.8	57.63	17.13	11.8	43.16	36.05	11.9	18.56	23.06	10.9	20.90	45.81
12.7	19.99	23.64	12.7	57.78	17.01	12.8	43.33	35.86	12.9	18.93	22.76	11.9	20.81	45.48
13.7	21.21	23.63	13.7	57.95	16.88	13.8	43.50	35.66	13.9	19.30	22.45	12.9	20.70	45.14
14.7	22.50	23.63	14.7	58.12	16.75	14.8	43.69	35.45	14.9	19.69	22.13	13.9	20.58	44.79
15.7	23.85	23.64	15.7	58.30	16.62	15.8	43.88	35.24	15.9	20.13	21.79	14.9	20.46	44.42
16.7	25.24	23.66	16.7	58.50	16.51	16.8	44.09	35.04	16.9	20.62	21.44	15.9	20.36	44.04
17.7	26.66	23.72	17.7	58.70	16.43	17.8	44.31	34.86	17.9	21.17	21.11	16.9	20.28	43.63
18.7	28.10	23.80	18.7	58.90	16.36	18.8	44.53	34.70	18.8	21.76	20.80	17.9	20.26	43.21
19.7	29.49	23.91	19.7	59.10	16.32	19.8	44.76	34.56	19.8	22.38	20.51	18.9	20.26	42.78
20.7	30.80	24.02	20.7	59.29	16.31	20.8	44.98	34.45	20.8	23.00	20.24	19.9	20.30	42.36
21.7	32.03	24.15	21.7	59.48	16.31	21.8	45.19	34.37	21.8	23.61	19.99	20.9	20.38	41.97
22.7	33.17	24.27	22.7	59.65	16.30	22.8	45.39	34.28	22.8	24.17	19.76	21.9	20.47	41.60
23.7	34.26	24.37	23.7	59.81	16.28	23.8	45.57	34.19	23.8	24.69	19.54	22.9	20.54	41.25
24.7	35.32	24.45	24.7	59.97	16.24	24.8	45.75	34.09	24.8	25.16	19.30	23.9	20.60	40.93
25.7	36.41	24.51	25.7	60.13	16.19	25.8	45.93	33.95	25.8	25.61	19.05	24.9	20.63	40.61
26.7	37.57	24.57	26.7	60.30	16.12	26.7	46.11	33.81	26.8	26.07	18.79	25.9	20.62	40.27
27.7	38.78	24.63	27.7	60.47	16.05	27.7	46.30	33.66	27.8	26.56	18.52	26.9	20.60	39.93
28.7	40.05	24.71	28.7	60.65	16.00	28.7	46.50	33.52	28.8	27.10	18.24	27.9	20.59	39.56
29.7	41.36	24.80	29.7	60.85	15.96	29.7	46.72	33.39	29.8	27.68	17.96	28.9	20.60	39.19
30.6	42.67	24.93	30.7	61.05	15.94	30.7	46.94	33.29	30.8	28.32	17.69	29.9	20.63	38.79
31.6	43.96	25.08	31.7	61.24	15.95	31.7	47.17	33.21	31.8	29.00	17.43	30.9	20.72	38.38
32.6	45.21	25.25	32.7	61.43	15.99	32.7	47.40	33.16	32.8	29.70	17.21	31.9	20.84	37.98
51.62		+51.61	6.93		+6.86	8.20		+8.14	31.36		+31.35	23.51		+23.49
$8^{h}\ 11^{m}$		$46^{s}.151$	$9^{h}\ 24^{m}$		$46^{s}.516$	$10^{h}\ 20^{m}$		$34^{s}.492$	$12^{h}\ 14^{m}$		$26^{s}.979$	$15^{h}\ 4^{m}$		$59^{s}.30$
+88° 53′		44″.41	+81° 42′		44″.16	+83° 0′		6″.83	+88° 10′		55″.87	+87° 34′		6″.01

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Dec.	8 13	+88 53	Dec.	9 25	+81 42	Dec.	10 20	+82 59	Dec.	12 14	+88 10	Dec.	15 4	+87 33
	s	″		s	″		s	″		s	″		s	″
1.6	43.96	25.08	1.7	1.24	15.95	1.7	47.17	33.21	1.8	29.00	17.43	1.9	20.84	37.98
2.6	45.21	25.25	2.7	1.43	15.99	2.7	47.40	33.16	2.8	29.70	17.21	2.9	21.00	37.59
3.6	46.39	25.44	3.7	1.62	16.05	3.7	47.62	33.11	3.8	30.40	17.01	3.9	21.19	37.21
4.6	47.50	25.63	4.7	1.79	16.11	4.7	47.84	33.09	4.8	31.09	16.83	4.9	21.39	36.86
5.6	48.53	25.82	5.7	1.96	16.18	5.7	48.04	33.09	5.8	31.76	16.67	5.9	21.60	36.52
6.6	49.51	26.00	6.7	2.12	16.25	6.7	48.23	33.08	6.8	32.40	16.51	6.9	21.80	36.21
7.6	50.46	26.17	7.7	2.28	16.31	7.7	48.42	33.07	7.8	33.01	16.36	7.9	21.98	35.90
8.6	51.39	26.34	8.7	2.43	16.36	8.7	48.61	33.05	8.8	33.59	16.20	8.9	22.15	35.61
9.6	52.32	26.48	9.7	2.58	16.40	9.7	48.79	33.03	9.8	34.15	16.04	9.9	22.29	35.30
10.6	53.28	26.62	10.7	2.73	16.44	10.7	48.96	32.99	10.8	34.70	15.87	10.9	22.42	34.99
11.6	54.30	26.75	11.7	2.89	16.46	11.7	49.15	32.94	11.8	35.26	15.69	11.9	22.54	34.68
12.6	55.37	26.91	12.7	3.06	16.49	12.7	49.34	32.89	12.8	35.87	15.50	12.9	22.68	34.34
13.6	56.48	27.06	13.7	3.24	16.53	13.7	49.55	32.85	13.8	36.51	15.29	13.9	22.84	33.98
14.6	57.62	27.24	14.7	3.42	16.58	14.7	49.77	32.82	14.8	37.21	15.10	14.9	23.04	33.61
15.6	58.76	27.45	15.7	3.60	16.67	15.7	50.00	32.81	15.8	37.95	14.91	15.9	23.27	33.24
16.6	59.87	27.69	16.7	3.78	16.78	16.7	50.23	32.83	16.8	38.73	14.76	16.9	23.54	32.88
17.6	60.91	27.95	17.7	3.96	16.91	17.7	50.45	32.87	17.8	39.52	14.63	17.9	23.85	32.54
18.6	61.84	28.21	18.6	4.13	17.06	18.7	50.67	32.94	18.8	40.29	14.52	18.9	24.19	32.22
19.6	62.69	28.47	19.6	4.29	17.21	19.7	50.87	33.02	19.8	41.03	14.45	19.9	24.52	31.92
20.6	63.47	28.71	20.6	4.43	17.36	20.7	51.05	33.10	20.8	41.71	14.38	20.9	24.83	31.65
21.6	64.20	28.94	21.6	4.57	17.48	21.7	51.22	33.16	21.8	42.34	14.31	21.9	25.12	31.41
22.6	64.92	29.14	22.6	4.70	17.59	22.7	51.39	33.21	22.8	42.93	14.23	22.9	25.38	31.15
23.6	65.67	29.33	23.6	4.83	17.69	23.7	51.55	33.24	23.8	43.52	14.13	23.9	25.60	30.89
24.6	66.48	29.51	24.6	4.97	17.77	24.7	51.72	33.26	24.8	44.11	14.01	24.9	25.82	30.62
25.6	67.34	29.71	25.6	5.12	17.86	25.7	51.91	33.28	25.7	44.75	13.89	25.9	26.06	30.33
26.6	68.24	29.92	26.6	5.28	17.96	26.7	52.11	33.30	26.7	45.44	13.77	26.9	26.32	30.02
27.6	69.16	30.16	27.6	5.45	18.08	27.7	52.31	33.35	27.7	46.17	13.66	27.9	26.62	29.70
28.6	70.07	30.42	28.6	5.61	18.24	28.7	52.52	33.43	28.7	46.93	13.56	28.9	26.96	29.38
29.6	70.94	30.71	29.6	5.77	18.42	29.7	52.73	33.53	29.7	47.74	13.50	29.9	27.34	29.07
30.6	71.73	31.01	30.6	5.92	18.62	30.7	52.93	33.65	30.7	48.53	13.46	30.9	27.76	28.78
31.6	72.43	31.32	31.6	6.07	18.84	31.7	53.12	33.79	31.7	49.31	13.45	31.8	28.19	28.51
32.6	73.05	31.64	32.6	6.21	19.06	32.7	53.31	33.95	32.7	50.06	13.44	32.8	28.61	28.27
	51.67	+51.66		6.93	+6.86		8.20	+8.14		31.33	+31.31		23.48	+23.46
	$8^h\ 11^m\ 46^s.151$			$9^h\ 24^m\ 46^s.516$			$10^h\ 20^m\ 34^s.492$			$12^h\ 14^m\ 26^s.979$			$15^h\ 4^m\ 59^s.30$	
		+88° 53′ 44″.41			+81° 42′ 44″.16			+83° 0′ 6″.83			+88° 10′ 55″.87			+87° 34′ 6″.01

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**89 H. Cephei.** Mag. 5.6		
Mean Solar Date.	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Jan.	16 54	+82 10	Jan.	17 59	+86 36	Jan.	19 5	+89 0	Jan.	20 48	+82 12	Jan.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
0.9	42.93	38.20	0.9	57.31	38.98	1.0	60.86	33.67	1.1	45.99	39.67	1.2	27.33	56.82
1.9	43.00	37.91	1.9	57.34	38.68	2.0	60.55	33.40	2.1	45.90	39.44	2.2	26.99	56.77
2.9	43.06	37.61	2.9	57.35	38.38	3.0	60.20	33.14	3.1	45.82	39.21	3.2	26.66	56.73
3.9	43.10	37.29	3.9	57.34	38.07	4.0	59.81	32.87	4.1	45.73	38.99	4.2	26.31	56.71
4.9	43.14	36.97	4.9	57.31	37.76	5.0	59.39	32.58	5.1	45.63	38.75	5.2	25.93	56.67
5.9	43.18	36.64	5.9	57.30	37.42	6.0	58.97	32.26	6.1	45.52	38.51	6.2	25.54	56.63
6.9	43.24	36.29	6.9	57.31	37.06	6.9	58.58	31.92	7.1	45.41	38.24	7.2	25.12	56.58
7.9	43.31	35.93	7.9	57.33	36.69	7.9	58.25	31.57	8.1	45.31	37.93	8.2	24.70	56.50
8.9	43.38	35.57	8.9	57.38	36.30	8.9	57.99	31.19	9.1	45.21	37.62	9.2	24.27	56.41
9.9	43.46	35.21	9.9	57.46	35.93	9.9	57.81	30.82	10.1	45.13	37.30	10.2	23.86	56.28
10.9	43.56	34.86	10.9	57.56	35.57	10.9	57.71	30.45	11.1	45.05	36.96	11.2	23.46	56.15
11.9	43.67	34.54	11.9	57.68	35.21	11.9	57.69	30.09	12.1	44.98	36.61	12.2	23.08	55.99
12.9	43.78	34.23	12.9	57.81	34.87	12.9	57.74	29.74	13.1	44.93	36.29	13.2	22.72	55.82
13.9	43.88	33.96	13.9	57.95	34.56	13.9	57.82	29.41	14.1	44.88	35.97	14.2	22.39	55.66
14.9	43.98	33.69	14.9	58.10	34.25	14.9	57.93	29.09	15.0	44.83	35.67	15.2	22.07	55.50
15.9	44.08	33.44	15.9	58.22	33.97	15.9	58.02	28.81	16.0	44.79	35.39	16.2	21.77	55.37
16.9	44.18	33.19	16.9	58.33	33.70	16.9	58.07	28.53	17.0	44.75	35.12	17.2	21.48	55.24
17.9	44.26	32.94	17.9	58.42	33.43	17.9	58.05	28.25	18.0	44.70	34.86	18.2	21.18	55.11
18.9	44.34	32.69	18.9	58.50	33.14	18.9	57.98	27.96	19.0	44.64	34.60	19.1	20.86	55.01
19.9	44.41	32.40	19.9	58.58	32.83	19.9	57.86	27.65	20.0	44.57	34.33	20.1	20.51	54.90
20.9	44.50	32.09	20.9	58.66	32.50	20.9	57.75	27.33	21.0	44.49	34.02	21.1	20.15	54.79
21.9	44.60	31.77	21.9	58.76	32.15	21.9	57.68	26.97	22.0	44.42	33.69	22.1	19.77	54.65
22.9	44.71	31.44	22.9	58.90	31.80	22.9	57.71	26.60	23.0	44.36	33.35	23.1	19.38	54.48
23.9	44.82	31.13	23.9	59.06	31.44	23.9	57.85	26.23	24.0	44.30	32.98	24.1	19.01	54.27
24.9	44.96	30.84	24.9	59.25	31.10	24.9	58.10	25.86	25.0	44.27	32.61	25.1	18.64	54.06
25.9	45.10	30.57	25.9	59.47	30.78	25.9	58.44	25.52	26.0	44.24	32.25	26.1	18.33	53.83
26.9	45.24	30.34	26.9	59.70	30.50	26.9	58.85	25.20	27.0	44.23	31.91	27.1	18.05	53.60
27.9	45.38	30.15	27.9	59.93	30.24	27.9	59.30	24.89	28.0	44.23	31.59	28.1	17.81	53.37
28.8	45.50	29.96	28.9	60.13	30.02	28.9	59.71	24.62	29.0	44.23	31.29	29.1	17.57	53.17
29.8	45.62	29.78	29.9	60.33	29.79	29.9	60.08	24.36	30.0	44.23	31.00	30.1	17.33	52.97
30.8	45.73	29.58	30.9	60.51	29.55	30.9	60.38	24.10	31.0	44.22	30.72	31.1	17.09	52.79
31.8	45.84	29.37	31.9	60.68	29.31	31.9	60.66	23.82	32.0	44.20	30.43	32.1	16.83	52.60
32.8	45.95	29.16	32.9	60.85	29.04	32.9	60.94	23 52	32.9	44.17	30.12	33.1	16.56	52.41
	7.35	+7.28		16.91	+16.88		57.77	+57.76		7.38	+7.31		18.10	+18.07
	16h 54m	50s.519		18h 0m	19s.30		19h 7m	25s.98		20h 48m	57s.123		23h 27m	45s.157
	+82° 10′	55″.32		+86° 36′	51″.09		+89° 0′	39″.69		+82° 12′	35″.90		+86° 49′	39″.43

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**30 H. Cephei.** Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Feb.	16 54	+82 10	Feb.	18 0	+86 36	Feb.	19 6	+89 0	Feb.	20 48	+82 12	Feb.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.8	45.95	29.16	1.9	0.85	29.04	1.9	0.94	23.52	1.0	44.20	30.43	1.1	16.83	52.60
2.8	46.07	28.93	2.9	1.04	28.76	2.9	1.22	23.22	1.9	44.17	30.12	2.1	16.56	52.41
3.8	46.20	28.69	3.9	1.23	28.47	3.9	1.53	22.90	2.9	44.14	29.80	3.1	16.26	52.21
4.8	46.33	28.45	4.9	1.45	28.18	4.9	1.92	22.57	3.9	44.12	29.47	4.1	15.96	51.99
5.8	46.48	28.22	5.9	1.69	27.88	5.9	2.39	22.23	4.9	44.10	29.12	5.1	15.65	51.75
6.8	46.63	28.01	6.9	1.96	27.59	6.9	2.94	21.90	5.9	44.10	28.75	6.1	15.36	51.49
7.8	46.79	27.80	7.9	2.25	27.32	7.9	3.56	21.58	6.9	44.10	28.37	7.1	15.07	51.21
8.8	46.96	27.63	8.9	2.55	27.07	8.9	4.25	21.26	7.9	44.11	28.00	8.1	14.80	50.93
9.8	47.13	27.48	9.9	2.85	26.83	9.9	4.99	20.96	8.9	44.13	27.64	9.1	14.57	50.63
10.8	47.29	27.34	10.9	3.15	26.63	10.9	5.75	20.70	9.9	44.16	27.29	10.1	14.37	50.33
11.8	47.44	27.23	11.9	3.45	26.45	11.9	6.50	20.44	10.9	44.20	26.95	11.1	14.18	50.03
12.8	47.59	27.13	12.9	3.73	26.28	12.9	7.22	20.21	11.9	44.25	26.63	12.1	14.03	49.76
13.8	47.73	27.03	13.9	3.99	26.11	13.9	7.89	19.99	12.9	44.29	26.34	13.1	13.88	49.49
14.8	47.87	26.91	14.8	4.23	25.94	14.9	8.48	19.77	13.9	44.32	26.07	14.1	13.74	49.24
15.8	47.98	26.78	15.8	4.47	25.76	15.9	9.02	19.54	14.9	44.35	25.79	15.1	13.58	49.02
16.8	48.11	26.65	16.8	4.71	25.54	16.9	9.55	19.28	15.9	44.38	25.52	16.1	13.40	48.79
17.8	48.25	26.48	17.8	4.95	25.32	17.9	10.09	19.00	16.9	44.39	25.23	17.1	13.19	48.56
18.8	48.40	26.30	18.8	5.23	25.08	18.9	10.69	18.71	17.9	44.40	24.91	18.1	12.96	48.32
19.8	48.56	26.14	19.8	5.52	24.84	19.9	11.39	18.41	18.9	44.41	24.57	19.1	12.73	48.04
20.8	48.72	26.00	20.8	5.85	24.61	20.9	12.19	18.12	19.9	44.43	24.23	20.1	12.51	47.75
21.8	48.91	25.89	21.8	6.20	24.41	21.9	13.10	17.86	20.9	44.48	23.87	21.1	12.32	47.43
22.8	49.09	25.81	22.8	6.56	24.24	22.9	14.08	17.62	21.9	44.53	23.51	22.1	12.16	47.09
23.8	49.26	25.76	23.8	6.93	24.11	23.9	15.10	17.40	22.9	44.60	23.17	23.1	12.03	46.76
24.8	49.43	25.73	24.8	7.27	24.01	24.9	16.10	17.21	23.9	44.68	22.86	24.0	11.94	46.43
25.8	49.58	25.72	25.8	7.59	23.91	25.9	17.05	17.04	24.9	44.76	22.58	25.0	11.88	46.13
26.8	49.73	25.70	26.8	7.90	23.81	26.9	17.92	16.88	25.9	44.85	22.31	26.0	11.83	45.83
27.8	49.86	25.67	27.8	8.20	23.71	27.9	18.75	16.70	26.9	44.93	22.06	27.0	11.78	45.56
28.8	50.00	25.63	28.8	8.48	23.60	28.9	19.56	16.52	27.9	45.00	21.82	28.0	11.71	45.30
29.8	50.15	25.58	29.8	8.76	23.47	29.9	20.37	16.32	28.9	45.06	21.56	29.0	11.62	45.04
30.8	50.30	25.52	30.8	9.08	23.32	30.9	21.20	16.11	29.9	45.11	21.30	30.0	11.51	44.76
	7.34	+7.28		16.90	+16.87		57.61	+57.60		7.38	+7.31		18.09	+18.06
16h 54m 50s.519			18h 0m 19s.30			19h 7m 25s.98			20h 48m 57s.123			23h 27m 45s.157		
+82° 10′ 55″.32			+86° 36′ 51″.09			+89° 0′ 39″.69			+82° 12′ 35″.90			+86° 49′ 39″.43		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			30 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Mar.	16 54	+82 10	Mar.	18 0	+86 36	Mar.	19 6	+89 0	Mar.	20 48	+82 12	Mar.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.8	50.15	25.58	1.8	8.76	23.47	1.9	20.37	16.32	1.9	45.11	21.30	1.0	11.62	45.04
2.8	50.30	25.52	2.8	9.08	23.32	2.8	21.20	16.11	2.9	45.17	21.01	2.0	11.51	44.76
3.8	50.46	25.46	3.8	9.41	23.16	3.8	22.08	15.89	3.9	45.23	20.71	3.0	11.39	44.47
4.8	50.62	25.40	4.8	9.74	23.02	4.8	23.02	15.67	4.9	45.30	20.41	4.0	11.27	44.16
5.8	50.79	25.34	5.8	10.10	22.89	5.8	24.03	15.45	5.9	45.38	20.10	5.0	11.16	43.84
6.7	50.97	25.31	6.8	10.47	22.77	6.8	25.11	15.24	6.9	45.47	19.78	6.0	11.07	43.51
7.7	51.15	25.30	7.8	10.86	22.65	7.8	26.27	15.03	7.9	45.56	19.47	7.0	10.99	43.16
8.7	51.33	25.31	8.8	11.26	22.58	8.8	27.47	14.86	8.9	45.67	19.18	8.0	10.94	42.81
9.7	51.51	25.36	9.8	11.66	22.52	9.8	28.69	14.70	9.9	45.79	18.90	9.0	10.92	42.46
10.7	51.69	25.41	10.8	12.05	22.48	10.8	29.91	14.58	10.9	45.91	18.65	10.0	10.93	42.09
11.7	51.85	25.48	11.8	12.42	22.47	11.8	31.09	14.47	11.9	46.03	18.43	11.0	10.95	41.76
12.7	52.00	25.55	12.8	12.77	22.46	12.8	32.21	14.38	12.9	46.14	18.23	12.0	11.00	41.44
13.7	52.15	25.62	13.8	13.09	22.47	13.8	33.25	14.29	13.9	46.25	18.04	13.0	11.06	41.15
14.7	52.29	25.69	14.8	13.40	22.45	14.8	34.22	14.20	14.9	46.35	17.84	14.0	11.11	40.87
15.7	52.43	25.74	15.8	13.70	22.42	15.8	35.15	14.10	15.9	46.44	17.64	14.9	11.14	40.60
16.7	52.56	25.76	16.8	14.00	22.36	16.8	36.07	13.98	16.9	46.52	17.42	15.9	11.14	40.33
17.7	52.70	25.78	17.8	14.33	22.30	17.8	37.01	13.84	17.9	46.61	17.19	16.9	11.13	40.07
18.7	52.86	25.79	18.8	14.67	22.24	18.8	38.03	13.69	18.9	46.70	16.94	17.9	11.11	39.78
19.7	53.02	25.82	19.8	15.03	22.18	19.8	39.15	13.54	19.9	46.81	16.68	18.9	11.08	39.48
20.7	53.19	25.88	20.8	15.42	22.14	20.8	40.37	13.40	20.9	46.93	16.42	19.9	11.08	39.14
21.7	53.36	25.97	21.8	15.82	22.13	21.8	41.66	13.30	21.9	47.07	16.19	20.9	11.11	38.79
22.7	53.52	26.08	22.7	16.23	22.14	22.8	42.98	13.22	22.9	47.21	15.98	21.9	11.18	38.44
23.7	53.68	26.24	23.7	16.61	22.20	23.8	44.28	13.18	23.9	47.35	15.80	22.9	11.28	38.12
24.7	53.83	26.40	24.7	16.98	22.27	24.8	45.53	13.15	24.9	47.49	15.64	23.9	11.42	37.80
25.7	53.98	26.56	25.7	17.32	22.35	25.8	46.72	13.14	25.9	47.63	15.51	24.9	11.58	37.50
26.7	54.11	26.71	26.7	17.64	22.44	26.8	47.83	13.14	26.9	47.77	15.39	25.9	11.73	37.22
27.7	54.24	26.85	27.7	17.94	22.50	27.8	48.89	13.13	27.9	47.89	15.26	26.9	11.87	36.96
28.7	54.36	26.98	28.7	18.25	22.55	28.8	49.92	13.10	28.8	48.01	15.13	27.9	11.99	36.71
29.7	54.48	27.08	29.7	18.56	22.60	29.8	50.95	13.06	29.8	48.13	14.97	28.9	12.10	36.46
30.7	54.62	27.19	30.7	18.89	22.62	30.8	52.02	13.00	30.8	48.25	14.80	29.9	12.19	36.19
31.7	54.76	27.30	31.7	19.23	22.65	31.8	53.14	12.94	31.8	48.37	14.63	30.9	12.27	35.92
32.7	54.91	27.41	32.7	19.59	22.68	32.8	54.32	12.88	32.8	48.51	14.45	31.9	12.36	35.63
	7.34	+7.28		16.89	+16.86		57.52	+57.52		7.37	+7.30		18.07	+18.04
	$16^h\ 54^m$	$50^s.519$		$18^h\ 0^m$	$19^s.30$		$19^h\ 7^m$	$25^s.98$		$20^h\ 48^m$	$57^s.123$		$23^h\ 27^m$	$45^s.157$
	+82° 10′	55″.32		+86° 36′	51″.09		+89° 0′	39″.69		+82° 12′	35″.90		+86° 49′	39″.43

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**39 H. Cephei.** Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Apr.	16 54	+82 10	Apr.	18 0	+86 36	Apr.	19 6	+89 0	Apr.	20 48	+82 12	Apr.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.7	54.91	27.41	1.7	19.59	22.68	1.8	54.32	12.88	1.8	48.51	14.45	1.9	12.47	35.33
2.7	55.06	27.55	2.7	19.96	22.72	2.8	55.56	12.83	2.8	48.65	14.27	2.9	12.58	35.02
3.7	55.21	27.70	3.7	20.34	22.79	3.8	56.85	12.79	3.8	48.79	14.10	3.9	12.72	34.70
4.7	55.36	27.87	4.7	20.73	22.87	4.8	58.18	12.78	4.8	48.94	13.95	4.9	12.88	34.38
5.7	55.51	28.07	5.7	21.12	22.97	5.8	59.53	12.78	5.8	49.11	13.81	5.9	13.07	34.07
6.7	55.66	28.29	6.7	21.49	23.10	6.8	60.88	12.80	6.8	49.28	13.70	6.9	13.30	33.78
7.7	55.79	28.52	7.7	21.84	23.25	7.8	62.18	12.86	7.8	49.45	13.61	7.9	13.53	33.50
8.7	55.92	28.76	8.7	22.18	23.41	8.7	63.42	12.93	8.8	49.61	13.54	8.9	13.78	33.24
9.7	56.03	28.99	9.7	22.49	23.57	9.7	64.58	13.01	9.8	49.77	13.49	9.9	14.03	33.01
10.7	56.13	29.21	10.7	22.77	23.73	10.7	65.66	13.09	10.8	49.92	13.45	10.9	14.26	32.79
11.6	56.23	29.42	11.7	23.04	23.87	11.7	66.67	13.16	11.8	50.06	13.40	11.9	14.47	32.59
12.6	56.33	29.60	12.7	23.31	24.00	12.7	67.64	13.22	12.8	50.18	13.34	12.9	14.66	32.39
13.6	56.43	29.76	13.7	23.57	24.10	13.7	68.62	13.25	13.8	50.30	13.27	13.9	14.83	32.17
14.6	56.54	29.93	14.7	23.86	24.20	14.7	69.65	13.27	14.8	50.43	13.17	14.9	15.00	31.94
15.6	56.65	30.10	15.7	24.17	24.30	15.7	70.76	13.29	15.8	50.57	13.07	15.9	15.17	31.68
16.6	56.78	30.29	16.7	24.51	24.41	16.7	71.95	13.32	16.8	50.72	12.98	16.9	15.35	31.42
17.6	56.91	30.52	17.7	24.85	24.56	17.7	73.20	13.37	17.8	50.88	12.89	17.9	15.59	31.15
18.6	57.04	30.77	18.7	25.19	24.73	18.7	74.48	13.45	18.8	51.05	12.84	18.9	15.86	30.89
19.6	57.15	31.06	19.7	25.53	24.93	19.7	75.77	13.55	19.8	51.24	12.80	19.9	16.16	30.64
20.6	57.26	31.35	20.7	25.83	25.15	20.7	76.99	13.69	20.8	51.42	12.80	20.9	16.48	30.42
21.6	57.35	31.64	21.7	26.11	25.39	21.7	78.14	13.84	21.8	51.59	12.81	21.9	16.81	30.22
22.6	57.43	31.94	22.7	26.36	25.63	22.7	79.20	14.00	22.8	51.75	12.85	22.9	17.14	30.05
23.6	57.49	32.22	23.7	26.60	25.85	23.7	80.18	14.16	23.8	51.91	12.89	23.9	17.44	29.90
24.6	57.56	32.48	24.7	26.82	26.06	24.7	81.12	14.30	24.8	52.06	12.93	24.9	17.72	29.74
25.6	57.64	32.72	25.7	27.05	26.25	25.7	82.04	14.43	25.8	52.19	12.95	25.9	17.98	29.57
26.6	57.72	32.95	26.7	27.29	26.42	26.7	82.97	14.55	26.8	52.33	12.96	26.9	18.22	29.40
27.6	57.80	33.17	27.7	27.53	26.60	27.7	83.93	14.64	27.8	52.47	12.96	27.9	18.47	29.22
28.6	57.88	33.40	28.6	27.78	26.78	28.7	84.94	14.74	28.8	52.62	12.95	28.9	18.72	29.02
29.6	57.98	33.66	29.6	28.06	26.96	29.7	86.00	14.85	29.8	52.77	12.93	29.9	18.99	28.82
30.6	58.07	33.92	30.6	28.35	27.16	30.7	87.10	14.96	30.8	52.93	12.93	30.9	19.27	28.62
31.6	58.16	34.20	31.6	28.63	27.37	31.7	88.23	15.10	31.8	53.10	12.93	31.9	19.58	28.41
	7.35	+7.28		16.90	+16.87		57.51	+57.50		7.37	+7.30		18.06	+18.03
	$16^{h}\ 54^{m}$	$50^{s}.519$		$18^{h}\ 0^{m}$	$19^{s}.30$		$19^{h}\ 7^{m}$	$25^{s}.98$		$20^{h}\ 48^{m}$	$57^{s}.123$		$23^{h}\ 27^{m}$	$45^{s}.157$
	$+82^{\circ}\ 10'$	$55''.32$		$+86^{\circ}\ 36'$	$51''.09$		$+89^{\circ}\ 0'$	$39''.69$		$+82^{\circ}\ 12'$	$35''.90$		$+86^{\circ}\ 49'$	$39''.43$

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**39 H. Cephei.** Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
May	16 54	+82 10	May	18 0	+86 36	May	19 7	+89 0	May	20 48	+82 12	May	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.6	58.16	34.20	1.6	28.63	27.37	1.7	28.23	15.10	1.8	53.10	12.93	1.9	19.58	28.41
2.6	58.25	34.50	2.6	28.91	27.61	2.7	29.38	15.26	2.8	53.29	12.96	2.9	19.92	28.22
3.6	58.34	34.82	3.6	29.18	27.88	3.7	30.54	15.43	3.8	53.47	13.01	3.9	20.27	28.04
4.6	58.42	35.15	4.6	29.43	28.16	4.7	31.65	15.64	4.7	53.64	13.07	4.9	20.64	27.86
5.6	58.49	35.49	5.6	29.66	28.44	5.7	32.70	15.86	5.7	53.81	13.17	5.9	21.02	27.71
6.6	58.54	35.83	6.6	29.86	28.73	6.7	33.66	16.09	6.7	53.98	13.28	6.9	21.41	27.59
7.6	58.58	36.16	7.6	30.04	29.02	7.7	34.53	16.33	7.7	54.15	13.41	7.9	21.78	27.49
8.6	58.62	36.47	8.6	30.19	29.30	8.7	35.30	16.54	8.7	54.29	13.54	8.8	22.13	27.42
9.6	58.65	36.76	9.6	30.34	29.56	9.7	36.01	16.74	9.7	54.42	13.66	9.8	22.45	27.35
10.6	58.68	37.02	10.6	30.48	29.79	10.7	36.71	16.93	10.7	54.54	13.77	10.8	22.75	27.27
11.6	58.72	37.28	11.6	30.64	30.01	11.7	37.43	17.10	11.7	54.67	13.85	11.8	23.04	27.17
12.6	58.77	37.54	12.6	30.81	30.22	12.7	38.20	17.26	12.7	54.81	13.92	12.8	23.33	27.07
13.6	58.82	37.80	13.6	31.01	30.45	13.7	39.05	17.42	13.7	54.95	13.98	13.8	23.63	26.94
14.6	58.88	38.09	14.6	31.22	30.70	14.7	39.98	17.59	14.7	55.10	14.06	14.8	23.96	26.81
15.6	58.94	38.40	15.6	31.43	30.97	15.6	40.94	17.80	15.7	55.26	14.15	15.8	24.32	26.68
16.6	58.99	38.74	16.6	31.64	31.26	16.6	41.91	18.04	16.7	55.43	14.27	16.8	24.71	26.56
17.6	59.03	39.09	17.6	31.81	31.59	17.6	42.83	18.29	17.7	55.60	14.42	17.8	25.13	26.47
18.5	59.06	39.46	18.6	31.96	31.93	18.6	43.67	18.58	18.7	55.77	14.60	18.8	25.56	26.39
19.5	59.06	39.83	19.6	32.08	32.27	19.6	44.40	18.87	19.7	55.93	14.80	19.8	25.98	26.35
20.5	59.06	40.18	20.6	32.18	32.60	20.6	45.04	19.16	20.7	56.07	15.01	20.8	26.39	26.33
21.5	59.06	40.50	21.6	32.26	32.91	21.6	45.62	19.44	21.7	56.20	15.21	21.8	26.77	26.32
22.5	59.06	40.81	22.6	32.34	33.21	22.6	46.15	19.70	22.7	56.33	15.39	22.8	27.12	26.32
23.5	59.06	41.10	23.6	32.41	33.49	23.6	46.67	19.94	23.7	56.45	15.57	23.8	27.46	26.32
24.5	59.07	41.38	24.6	32.49	33.75	24.6	47.21	20.17	24.7	56.57	15.74	24.8	27.79	26.29
25.5	59.08	41.66	25.6	32.59	34.01	25.6	47.80	20.39	25.7	56.69	15.88	25.8	28.12	26.25
26.5	59.09	41.94	26.6	32.70	34.27	26.6	48.43	20.61	26.7	56.82	16.03	26.8	28.45	26.21
27.5	59.11	42.24	27.6	32.83	34.54	27.6	49.10	20.84	27.7	56.96	16.18	27.8	28.80	26.16
28.5	59.13	42.55	28.6	32.96	34.83	28.6	49.81	21.08	28.7	57.10	16.33	28.8	29.17	26.11
29.5	59.15	42.87	29.6	33.08	35.14	29.6	50.52	21.33	29.7	57.24	16.51	29.8	29.56	26.06
30.5	59.17	43.22	30.6	33.19	35.46	30.6	51.21	21.61	30.7	57.39	16.69	30.8	29.97	26.02
31.5	59.17	43.57	31.6	33.29	35.80	31.6	51.88	21.91	31.7	57.54	16.90	31.8	30.40	26.00
32.5	59.16	43.94	32.6	33.36	36.15	32.6	52.50	22.24	32.7	57.69	17.14	32.8	30.84	26.01
	7.35	+7.28		16.90	+16.87		57.58	+57.57		7.37	+7.30		18.05	+18.02
$16^h\ 54^m$		$50^s.519$	$18^h\ 0^m$		$19^s.30$	$19^h\ 7^m$		$25^s.98$	$20^h\ 48^m$		$57^s.123$	$23^h\ 27^m$		$45^s.157$
+82° 10′		55″.32	+86° 36′		51″.09	+89° 0′		39″.69	+82° 12′		35″.90	+86° 49′		39″.43

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			89 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
June	16 54	+82 10	June	18 0	+86 36	June	19 7	+89 0	June	20 48	+82 12	June	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.5	59.16	43.94	1.6	33.36	36.15	1.6	52.50	22.24	1.7	57.69	17.14	1.8	30.84	26.01
2.5	59.15	44.30	2.6	33.41	36.51	2.6	53.02	22.57	2.7	57.84	17.40	2.8	31.28	26.04
3.5	59.11	44.66	3.6	33.44	36.88	3.6	53.45	22.91	3.7	57.96	17.68	3.8	31.70	26.09
4.5	59.07	44.99	4.5	33.44	37.23	4.6	53.78	23.24	4.7	58.08	17.96	4.8	32.10	26.17
5.5	59.03	45.30	5.5	33.41	37.55	5.6	54.02	23.56	5.7	58.18	18.22	5.8	32.49	26.25
6.5	58.98	45.59	6.5	33.39	37.86	6.6	54.21	23.85	6.7	58.28	18.48	6.8	32.83	26.34
7.5	58.94	45.86	7.5	33.37	38.14	7.6	54.43	24.13	7.7	58.37	18.72	7.8	33.16	26.41
8.5	58.91	46.12	8.5	33.36	38.40	8.6	54.68	24.38	8.7	58.46	18.93	8.8	33.48	26.46
9.5	58.89	46.38	9.5	33.37	38.67	9.6	55.00	24.63	9.7	58.56	19.14	9.8	33.81	26.50
10.5	58.87	46.66	10.5	33.40	38.95	10.6	55.39	24.89	10.6	58.67	19.35	10.8	34.16	26.53
11.5	58.85	46.96	11.5	33.44	39.25	11.6	55.83	25.17	11.6	58.79	19.57	11.8	34.54	26.55
12.5	58.83	47.29	12.5	33.48	39.58	12.6	56.28	25.48	12.6	58.91	19.82	12.8	34.94	26.59
13.5	58.80	47.64	13.5	33.50	39.93	13.6	56.71	25.81	13.6	59.04	20.09	13.7	35.37	26.64
14.5	58.75	48.00	14.5	33.49	40.30	14.6	57.06	26.16	14.6	59.16	20.39	14.7	35.81	26.73
15.5	58.69	48.36	15.5	33.45	40.67	15.6	57.30	26.52	15.6	59.27	20.71	15.7	36.25	26.83
16.5	58.62	48.70	16.5	33.39	41.04	16.6	57.45	26.88	16.6	59.38	21.04	16.7	36.68	26.97
17.5	58.54	49.01	17.5	33.29	41.39	17.6	57.51	27.24	17.6	59.47	21.37	17.7	37.07	27.12
18.5	58.46	49.31	18.5	33.20	41.72	18.6	57.51	27.57	18.6	59.55	21.68	18.7	37.44	27.27
19.5	58.39	49.58	19.5	33.10	42.02	19.6	57.49	27.89	19.6	59.62	21.98	19.7	37.77	27.43
20.5	58.32	49.84	20.5	33.00	42.31	20.6	57.47	28.18	20.6	59.69	22.28	20.7	38.10	27.56
21.5	58.25	50.09	21.5	32.92	42.59	21.5	57.48	28.47	21.6	59.77	22.55	21.7	38.42	27.68
22.5	58.19	50.34	22.5	32.84	42.87	22.5	57.52	28.74	22.6	59.85	22.81	22.7	38.75	27.80
23.5	58.14	50.60	23.5	32.79	43.15	23.5	57.61	29.02	23.6	59.93	23.06	23.7	39.08	27.90
24.4	58.09	50.88	24.5	32.74	43.44	24.5	57.74	29.32	24.6	60.01	23.32	24.7	39.42	28.00
25.4	58.03	51.17	25.5	32.69	43.75	25.5	57.89	29.62	25.6	60.10	23.60	25.7	39.78	28.11
26.4	57.97	51.47	26.5	32.63	44.08	26.5	58.04	29.94	26.6	60.20	23.89	26.7	40.15	28.22
27.4	57.90	51.78	27.5	32.56	44.42	27.5	58.16	30.28	27.6	60.29	24.21	27.7	40.56	28.35
28.4	57.83	52.11	28.5	32.48	44.77	28.5	58.23	30.64	28.6	60.38	24.54	28.7	40.97	28.50
29.4	57.74	52.43	29.5	32.37	45.12	29.5	58.22	31.01	29.6	60.47	24.89	29.7	41.38	28.66
30.4	57.63	52.74	30.5	32.22	45.48	30.5	58.11	31.39	30.6	60.54	25.26	30.7	41.78	28.85
31.4	57.52	53.03	31.5	32.04	45.83	31.5	57.89	31.76	31.6	60.60	25.63	31.7	42.15	29.07
	7.35	+7.28		16.92	+16.89		57.72	+57.71		7.37	+7.31		18.05	+18.02
	$16^h\ 54^m$	$50^s.519$		$18^h\ 0^m$	$19^s.30$		$19^h\ 7^m$	$25^s.98$		$20^h\ 48^m$	$57^s.123$		$23^h\ 27^m$	$45^s.157$
	+82° 10′	55″.32		+86° 36′	51″.09		+89° 0′	39″.69		+82° 12′	35″.90		+86° 49′	39″.43

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**30 H. Cephei.** Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
July	16 54	+82 10	July	18 0	+86 36	July	19 7	+89 0	July	20 49	+82 12	July	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.4	57.52	53.03	1.5	32.04	45.83	1.5	57.89	31.76	1.6	0.60	25.63	1.7	42.15	29.07
2.4	57.41	53.31	2.5	31.85	46.15	2.5	57.58	32.12	2.6	0.65	26.00	2.7	42.51	29.30
3.4	57.30	53.54	3.5	31.66	46.45	3.5	57.22	32.45	3.6	0.69	26.36	3.7	42.82	29.53
4.4	57.18	53.76	4.5	31.46	46.72	4.5	56.84	32.77	4.6	0.73	26.70	4.7	43.12	29.77
5.4	57.08	53.96	5.5	31.27	46.97	5.5	56.48	33.06	5.6	0.75	27.02	5.7	43.40	29.98
6.4	56.98	54.15	6.5	31.10	47.22	6.5	56.18	33.34	6.6	0.78	27.32	6.7	43.67	30.19
7.4	56.90	54.37	7.5	30.95	47.47	7.5	55.95	33.62	7.6	0.83	27.61	7.7	43.95	30.36
8.4	56.81	54.60	8.5	30.82	47.75	8.5	55.78	33.91	8.6	0.88	27.91	8.7	44.26	30.53
9.4	56.72	54.86	9.5	30.69	48.05	9.5	55.65	34.23	9.6	0.95	28.23	9.7	44.60	30.71
10.4	56.63	55.14	10.4	30.55	48.36	10.5	55.50	34.57	10.6	1.01	28.57	10.7	44.96	30.91
11.4	56.52	55.43	11.4	30.37	48.70	11.5	55.30	34.94	11.6	1.07	28.94	11.7	45.34	31.12
12.4	56.40	55.72	12.4	30.18	49.04	12.5	55.01	35.31	12.6	1.13	29.32	12.7	45.72	31.35
13.4	56.27	55.99	13.4	29.96	49.38	13.5	54.62	35.70	13.6	1.17	29.72	13.7	46.09	31.63
14.4	56.13	56.24	14.4	29.71	49.70	14.5	54.12	36.06	14.6	1.20	30.12	14.7	46.42	31.91
15.4	55.99	56.46	15.4	29.46	49.99	15.5	53.55	36.41	15.6	1.22	30.50	15.7	46.73	32.20
16.4	55.85	56.66	16.4	29.19	50.26	16.5	52.94	36.73	16.5	1.23	30.88	16.7	47.00	32.49
17.4	55.71	56.86	17.4	28.93	50.51	17.5	52.34	37.04	17.5	1.23	31.24	17.7	47.26	32.76
18.4	55.58	57.03	18.4	28.68	50.75	18.5	51.76	37.32	18.5	1.23	31.58	18.7	47.51	33.03
19.4	55.46	57.20	19.4	28.44	50.98	19.5	51.22	37.60	19.5	1.23	31.91	19.7	47.75	33.28
20.4	55.34	57.35	20.4	28.22	51.21	20.5	50.73	37.88	20.5	1.24	32.23	20.6	47.99	33.53
21.4	55.23	57.54	21.4	28.01	51.45	21.5	50.28	38.16	21.5	1.26	32.54	21.6	48.25	33.76
22.4	55.12	57.73	22.4	27.81	51.70	22.5	49.84	38.45	22.5	1.28	32.86	22.6	48.52	33.99
23.4	55.00	57.94	23.4	27.60	51.96	23.5	49.40	38.75	23.5	1.30	33.20	23.6	48.80	34.23
24.4	54.88	58.15	24.4	27.37	52.24	24.5	48.96	39.07	24.5	1.33	33.56	24.6	49.10	34.47
25.4	54.75	58.37	25.4	27.14	52.54	25.5	48.49	39.41	25.5	1.36	33.92	25.6	49.41	34.73
26.4	54.61	58.59	26.4	26.88	52.83	26.5	47.94	39.75	26.5	1.38	34.30	26.6	49.72	35.02
27.4	54.46	58.81	27.4	26.60	53.12	27.4	47.31	40.11	27.5	1.39	34.70	27.6	50.03	35.32
28.4	54.29	59.02	28.4	26.30	53.41	28.4	46.58	40.46	28.5	1.38	35.12	28.6	50.32	35.65
29.4	54.12	59.20	29.4	25.96	53.67	29.4	45.75	40.80	29.5	1.36	35.53	29.6	50.59	35.99
30.3	53.95	59.35	30.4	25.60	53.91	30.4	44.85	41.11	30.5	1.33	35.93	30.6	50.82	36.35
31.3	53.78	59.46	31.4	25.25	54.13	31.4	43.92	41.40	31.5	1.30	36.31	31.6	51.02	36.70
32.3	53.62	59.56	32.4	24.91	54.31	32.4	42.98	41.67	32.5	1.25	36.67	32.6	51.18	37.04
	7.35	+7.28		16.93	+16.90		57.88	+57.88		7.38	+7.31		18.06	+18.03
	16^{h} 54^{m}	$50^{s}.519$		18^{h} 0^{m}	$19^{s}.30$		19^{h} 7^{m}	$25^{s}.98$		20^{h} 48^{m}	$57^{s}.123$		23^{h} 27^{m}	$45^{s}.157$
	+82° 10′	55″.32		+86° 36′	51″.09		+89° 0′	39″.69		+82° 12′	35″.90		+86° 49′	39″.43

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**39 H. Cephei.** Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Aug.	16 54	+82 10	Aug.	18 0	+86 36	Aug.	19 7	+89 0	Aug.	20 48	+82 12	Aug.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.3	53.62	59.56	1.4	24.91	54.31	1.4	42.98	41.67	1.5	61.25	36.67	1.6	51.18	37.04
2.3	53.47	59.66	2.4	24.59	54.49	2.4	42.08	41.92	2.5	61.21	37.00	2.6	51.34	37.35
3.3	53.32	59.76	3.4	24.29	54.67	3.4	41.27	42.17	3.5	61.18	37.32	3.6	51.52	37.64
4.3	53.19	59.87	4.4	24.00	54.85	4.4	40.54	42.42	4.5	61.16	37.64	4.6	51.71	37.93
5.3	53.05	60.00	5.4	23.73	55.06	5.4	39.85	42.68	5.5	61.14	37.98	5.6	51.92	38.22
6.3	52.91	60.15	6.4	23.44	55.29	6.4	39.17	42.98	6.5	61.13	38.33	6.6	52.16	38.51
7.3	52.76	60.33	7.4	23.15	55.54	7.4	38.44	43.30	7.5	61.13	38.70	7.6	52.42	38.82
8.3	52.59	60.50	8.4	22.83	55.80	8.4	37.65	43.62	8.5	61.12	39.09	8.6	52.69	39.14
9.3	52.42	60.65	9.4	22.48	56.05	9.4	36.77	43.96	9.5	61.09	39.50	9.6	52.93	39.50
10.3	52.24	60.80	10.4	22.12	56.29	10.4	35.79	44.28	10.5	61.05	39.91	10.6	53.16	39.88
11.3	52.05	60.92	11.4	21.74	56.51	11.4	34.72	44.59	11.5	61.00	40.31	11.6	53.35	40.26
12.3	51.86	61.01	12.4	21.34	56.70	12.4	33.61	44.87	12.5	60.95	40.70	12.6	53.52	40.64
13.3	51.68	61.09	13.4	20.95	56.87	13.4	32.50	45.13	13.5	60.88	41.06	13.6	53.66	41.02
14.3	51.51	61.14	14.4	20.56	57.02	14.4	31.39	45.37	14.5	60.81	41.41	14.6	53.77	41.38
15.3	51.34	61.18	15.4	20.20	57.16	15.4	30.32	45.59	15.5	60.74	41.74	15.6	53.88	41.73
16.3	51.18	61.22	16.3	19.85	57.30	16.4	29.32	45.81	16.5	60.68	42.06	16.6	54.00	42.07
17.3	51.03	61.27	17.3	19.51	57.44	17.4	28.35	46.03	17.5	60.62	42.37	17.6	54.12	42.39
18.3	50.88	61.35	18.3	19.18	57.59	18.4	27.42	46.26	18.5	60.56	42.68	18.6	54.26	42.71
19.3	50.74	61.43	19.3	18.85	57.74	19.4	26.51	46.49	19.5	60.52	43.00	19.6	54.40	43.03
20.3	50.58	61.51	20.3	18.52	57.92	20.4	25.60	46.74	20.5	60.48	43.33	20.6	54.56	43.35
21.3	50.42	61.60	21.3	18.18	58.10	21.4	24.66	47.01	21.5	60.43	43.68	21.6	54.73	43.69
22.3	50.25	61.71	22.3	17.83	58.29	22.4	23.67	47.29	22.4	60.38	44.05	22.6	54.91	44.05
23.3	50.07	61.80	23.3	17.45	58.48	23.4	22.62	47.57	23.4	60.32	44.42	23.6	55.08	44.42
24.3	49.88	61.88	24.3	17.05	58.67	24.4	21.47	47.84	24.4	60.26	44.81	24.6	55.25	44.82
25.3	49.68	61.94	25.3	16.62	58.84	25.4	20.23	48.11	25.4	60.18	45.19	25.6	55.39	45.23
26.3	49.48	61.96	26.3	16.18	58.98	26.4	18.90	48.36	26.4	60.09	45.57	26.5	55.49	45.64
27.3	49.28	61.97	27.3	15.72	59.10	27.4	17.53	48.59	27.4	59.99	45.93	27.5	55.56	46.07
28.3	49.08	61.96	28.3	15.28	59.20	28.4	16.15	48.78	28.4	59.88	46.26	28.5	55.60	46.48
29.3	48.90	61.93	29.3	14.85	59.27	29.4	14.81	48.95	29.4	59.76	46.58	29.5	55.63	46.87
30.3	48.73	61.89	30.3	14.45	59.33	30.4	13.53	49.11	30.4	59.66	46.87	30.5	55.64	47.24
31.3	48.57	61.85	31.3	14.05	59.40	31.4	12.33	49.27	31.4	59.56	47.15	31.5	55.67	47.59
32.3	48.41	61.84	32.3	13.69	59.48	32.4	11.19	49.45	32.4	59.48	47.44	32.5	55.72	47.93
	7.35	+7.28		16.94	+16.91		58.03	+58.03		7.38	+7.31		18.07	+18.05
	16^{h} 54^{m}	$50^{s}.519$		18^{h} 0^{m}	$19^{s}.30$		19^{h} 7^{m}	$25^{s}.98$		20^{h} 48^{m}	$57^{s}.123$		23^{h} 27^{m}	$45^{s}.157$
	+82° 10′	55″.32		+86° 36′	51″.09		+89° 0′	39″.69		+82° 12′	35″.90		+86° 49′	39″.43

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**39 H. Cephei.** Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Sept.	16 54	+82 10	Sept.	18 0	+86 36	Sept.	19 6	+89 0	Sept.	20 48	+82 12	Sept.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.3	48.41	61.84	1.3	13.69	59.48	1.4	71.19	49.45	1.4	59.48	47.44	1.5	55.72	47.93
2.3	48.25	61.85	2.3	13.32	59.59	2.3	70.09	49.66	2.4	59.41	47.75	2.5	55.80	48.28
3.3	48.08	61.89	3.3	12.95	59.72	3.3	68.98	49.87	3.4	59.33	48.07	3.5	55.91	48.63
4.3	47.90	61.93	4.3	12.55	59.85	4.3	67.82	50.10	4.4	59.25	48.42	4.5	56.02	49.01
5.2	47.71	61.96	5.3	12.12	59.99	5.3	66.57	50.35	5.4	59.17	48.78	5.5	56.12	49.41
6.2	47.52	61.98	6.3	11.69	60.12	6.3	65.23	50.59	6.4	59.07	49.15	6.5	56.21	49.83
7.2	47.32	61.97	7.3	11.22	60.23	7.3	63.81	50.82	7.4	58.95	49.52	7.5	56.27	50.26
8.2	47.12	61.93	8.3	10.75	60.31	8.3	62.33	51.02	8.4	58.83	49.86	8.5	56.30	50.70
9.2	46.91	61.88	9.3	10.29	60.37	9.3	60.85	51.18	9.4	58.70	50.18	9.5	56.29	51.12
10.2	46.71	61.80	10.3	9.83	60.41	10.3	59.37	51.34	10.4	58.57	50.48	10.5	56.26	51.53
11.2	46.54	61.71	11.3	9.39	60.43	11.3	57.93	51.47	11.4	58.44	50.77	11.5	56.22	51.92
12.2	46.37	61.62	12.3	8.97	60.45	12.3	56.54	51.59	12.4	58.32	51.03	12.5	56.17	52.30
13.2	46.20	61.53	13.3	8.56	60.46	13.3	55.23	51.71	13.4	58.20	51.27	13.5	56.13	52.65
14.2	46.04	61.46	14.3	8.17	60.48	14.3	53.95	51.82	14.4	58.08	51.52	14.5	56.10	53.00
15.2	45.88	61.39	15.3	7.79	60.51	15.3	52.70	51.95	15.4	57.97	51.77	15.5	56.09	53.35
16.2	45.72	61.33	16.3	7.41	60.55	16.3	51.47	52.10	16.4	57.87	52.03	16.5	56.09	53.70
17.2	45.56	61.29	17.3	7.02	60.60	17.3	50.23	52.26	17.4	57.77	52.32	17.5	56.11	54.06
18.2	45.38	61.25	18.3	6.62	60.67	18.3	48.96	52.42	18.4	57.66	52.61	18.5	56.13	54.43
19.2	45.20	61.21	19.3	6.20	60.74	19.3	47.63	52.59	19.4	57.55	52.91	19.5	56.14	54.82
20.2	45.01	61.17	20.3	5.76	60.80	20.3	46.23	52.76	20.4	57.43	53.22	20.5	56.15	55.24
21.2	44.82	61.09	21.2	5.29	60.85	21.3	44.72	52.93	21.4	57.30	53.53	21.5	56.14	55.66
22.2	44.62	60.98	22.2	4.81	60.87	22.3	43.15	53.08	22.4	57.16	53.84	22.5	56.10	56.09
23.2	44.41	60.86	23.2	4.32	60.86	23.3	41.53	53.19	23.4	57.00	54.14	23.5	56.02	56.53
24.2	44.22	60.71	24.2	3.84	60.84	24.3	39.89	53.29	24.4	56.84	54.40	24.5	55.91	56.96
25.2	44.03	60.54	25.2	3.37	60.78	25.3	38.27	53.35	25.4	56.67	54.64	25.5	55.77	57.36
26.2	43.87	60.37	26.2	2.94	60.72	26.3	36.72	53.40	26.4	56.51	54.85	26.5	55.64	57.74
27.2	43.71	60.19	27.2	2.51	60.66	27.3	35.25	53.45	27.4	56.36	55.05	27.5	55.51	58.10
28.2	43.55	60.04	28.2	2.11	60.60	28.3	33.86	53.50	28.3	56.23	55.25	28.5	55.40	58.45
29.2	43.39	59.90	29.2	1.72	60.57	29.3	32.52	53.57	29.3	56.10	55.45	29.5	55.31	58.79
30.2	43.23	59.78	30.2	1.32	60.55	30.3	31.19	53.66	30.3	55.98	55.68	30.5	55.25	59.14
31.2	43.07	59.68	31.2	0.92	60.56	31.3	29.83	53.77	31.3	55.85	55.93	31.4	55.20	59.50
	7.35	+7.28		16.95	+16.92		58.14	+58.13		7.38	+7.31		18.09	+18.06
	$16^h\ 54^m$	$50^s.519$		$18^h\ 0^m$	$19^s.30$		$19^h\ 7^m$	$25^s.98$		$20^h\ 48^m$	$57^s.123$		$23^h\ 27^m$	$45^s.157$
	+82° 10′	55″.32		+86° 36′	51″.09		+89° 0′	39″.69		+82° 12′	35″.90		+86° 49′	39″.43

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**30 H. Cephei.** Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Oct.	16 54	+82 10	Oct.	17 59	+86 36	Oct.	19 5	+89 0	Oct.	20 48	+82 12	Oct.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.2	43.07	59.68	1.2	60.92	60.56	1.3	89.83	53.77	1.3	55.85	55.93	1.4	55.20	59.50
2.2	42.89	59.58	2.2	60.48	60.56	2.3	88.41	53.89	2.3	55.71	56.20	2.4	55.15	59.89
3.2	42.71	59.47	3.2	60.02	60.56	3.3	86.90	54.01	3.3	55.57	56.47	3.4	55.09	60.30
4.2	42.52	59.34	4.2	59.55	60.54	4.3	85.31	54.11	4.3	55.42	56.74	4.4	55.00	60.73
5.2	42.33	59.18	5.2	59.07	60.49	5.3	83.67	54.21	5.3	55.25	56.99	5.4	54.88	61.14
6.2	42.14	59.00	6.2	58.59	60.42	6.3	82.01	54.26	6.3	55.08	57.23	6.4	54.73	61.55
7.2	41.96	58.80	7.2	58.12	60.33	7.3	80.35	54.29	7.3	54.90	57.44	7.4	54.55	61.94
8.2	41.79	58.58	8.2	57.68	60.22	8.2	78.73	54.29	8.3	54.72	57.62	8.4	54.35	62.32
9.2	41.64	58.35	9.2	57.24	60.10	9.2	77.17	54.28	9.3	54.55	57.77	9.4	54.15	62.68
10.2	41.49	58.12	10.2	56.84	59.98	10.2	75.68	54.26	10.3	54.38	57.92	10.4	53.96	63.02
11.1	41.35	57.91	11.2	56.45	59.85	11.2	74.26	54.26	11.3	54.22	58.07	11.4	53.77	63.34
12.1	41.21	57.71	12.2	56.07	59.75	12.2	72.88	54.24	12.3	54.07	58.21	12.4	53.60	63.66
13.1	41.07	57.51	13.2	55.70	59.65	13.2	71.53	54.26	13.3	53.93	58.35	13.4	53.43	63.98
14.1	40.93	57.33	14.2	55.33	59.56	14.2	70.19	54.28	14.3	53.79	58.51	14.4	53.28	64.31
15.1	40.78	57.15	15.2	54.95	59.48	15.2	68.83	54.30	15.3	53.65	58.68	15.4	53.14	64.64
16.1	40.63	56.98	16.2	54.55	59.41	16.2	67.43	54.34	16.3	53.50	58.86	16.4	53.01	64.99
17.1	40.48	56.80	17.2	54.15	59.33	17.2	65.97	54.37	17.3	53.35	59.06	17.4	52.88	65.34
18.1	40.31	56.61	18.2	53.71	59.25	18.2	64.44	54.40	18.3	53.19	59.25	18.4	52.72	65.72
19.1	40.14	56.39	19.2	53.27	59.15	19.2	62.84	54.42	19.3	53.01	59.44	19.4	52.52	66.10
20.1	39.97	56.16	20.2	52.81	59.03	20.2	61.18	54.41	20.3	52.82	59.62	20.4	52.30	66.48
21.1	39.80	55.90	21.2	52.35	58.87	21.2	59.50	54.38	21.3	52.63	59.77	21.4	52.06	66.86
22.1	39.65	55.61	22.2	51.91	58.69	22.2	57.85	54.33	22.3	52.43	59.89	22.4	51.80	67.22
23.1	39.51	55.31	23.2	51.49	58.49	23.2	56.24	54.25	23.3	52.24	59.99	23.4	51.52	67.55
24.1	39.38	55.01	24.2	51.10	58.29	24.2	54.72	54.16	24.3	52.06	60.07	24.4	51.23	67.86
25.1	39.26	54.72	25.2	50.73	58.10	25.2	53.30	54.07	25.3	51.89	60.14	25.4	50.96	68.15
26.1	39.14	54.47	26.2	50.39	57.92	26.2	51.95	53.99	26.3	51.73	60.20	26.4	50.71	68.43
27.1	39.04	54.23	27.2	50.05	57.77	27.2	50.64	53.94	27.3	51.58	60.29	27.4	50.49	68.71
28.1	38.91	54.00	28.1	49.69	57.63	28.2	49.32	53.90	28.3	51.43	60.40	28.4	50.29	69.01
29.1	38.78	53.78	29.1	49.33	57.50	29.2	47.97	53.87	29.3	51.28	60.51	29.4	50.09	69.31
30.1	38.64	53.56	30.1	48.94	57.37	30.2	46.53	53.86	30.3	51.12	60.65	30.4	49.90	69.65
31.1	38.49	53.31	31.1	48.53	57.24	31.2	45.01	53.84	31.3	50.94	60.80	31.4	49.68	70.00
32.1	38.35	53.05	32.1	48.11	57.09	32.2	43.42	53.80	32.3	50.75	60.92	32.4	49.42	70.34
	7.35	+7.28		16.94	+16.91		58.18	+58.17		7.38	+7.32		18.11	+18.08
	16^h 54^m	$50^s.519$		18^h 0^m	$19^s.30$		19^h 7^m	$25^s.98$		20^h 48^m	$57^s.123$		23^h 27^m	$45^s.157$
	+82° 10′	55″.32		+86° 36′	51″.09		+89° 0′	39″.69		+82° 12′	35″.90		+86° 49′	39″.43

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			30 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Nov.	16 54	+82 10	Nov.	17 59	+86 36	Nov.	19 5	+89 0	Nov.	20 48	+82 13	Nov.	23 27	+86 50
	s	″		s	″		s	″		s	″		s	″
1.1	38.35	53.05	1.1	48.11	57.09	1.2	43.42	53.80	1.3	50.75	0.92	1.4	49.42	10.34
2.1	38.20	52.75	2.1	47.69	56.89	2.2	41.81	53.73	2.3	50.55	1.03	2.4	49.13	10.68
3.1	38.06	52.44	3.1	47.28	56.68	3.2	40.21	53.63	3.2	50.36	1.10	3.4	48.81	11.01
4.1	37.94	52.10	4.1	46.89	56.45	4.2	38.66	53.50	4.2	50.16	1.15	4.4	48.48	11.31
5.1	37.82	51.76	5.1	46.52	56.20	5.2	37.17	53.37	5.2	49.97	1.19	5.4	48.15	11.60
6.1	37.72	51.43	6.1	46.19	55.94	6.2	35.76	53.21	6.2	49.79	1.19	6.4	47.82	11.86
7.1	37.63	51.11	7.1	45.87	55.69	7.2	34.42	53.04	7.2	49.61	1.19	7.3	47.48	12.11
8.1	37.54	50.80	8.1	45.56	55.44	8.2	33.14	52.88	8.2	49.44	1.19	8.3	47.17	12.34
9.1	37.45	50.49	9.1	45.27	55.22	9.2	31.91	52.75	9.2	49.28	1.18	9.3	46.87	12.57
10.1	37.36	50.20	10.1	44.98	55.01	10.2	30.72	52.63	10.2	49.14	1.19	10.3	46.59	12.80
11.1	37.28	49.92	11.1	44.69	54.80	11.2	29.53	52.52	11.2	48.98	1.21	11.3	46.32	13.02
12.1	37.19	49.65	12.1	44.39	54.60	12.2	28.31	52.41	12.2	48.82	1.24	12.3	46.05	13.27
13.1	37.09	49.38	13.1	44.07	54.40	13.2	27.04	52.29	13.2	48.66	1.29	13.3	45.78	13.52
14.1	36.99	49.09	14.1	43.74	54.21	14.1	25.72	52.18	14.2	48.49	1.33	14.3	45.51	13.79
15.1	36.88	48.80	15.1	43.40	54.00	15.1	24.33	52.08	15.2	48.32	1.37	15.3	45.21	14.07
16.1	36.77	48.48	16.1	43.04	53.76	16.1	22.89	51.96	16.2	48.12	1.40	16.3	44.88	14.34
17.0	36.67	48.13	17.1	42.70	53.49	17.1	21.42	51.79	17.2	47.93	1.41	17.3	44.52	14.61
18.0	36.57	47.75	18.1	42.36	53.21	18.1	19.97	51.59	18.2	47.74	1.39	18.3	44.13	14.86
19.0	36.49	47.37	19.1	42.05	52.90	19.1	18.58	51.39	19.2	47.55	1.33	19.3	43.73	15.09
20.0	36.41	46.99	20.1	41.76	52.58	20.1	17.28	51.16	20.2	47.37	1.27	20.3	43.33	15.30
21.0	36.35	46.61	21.1	41.51	52.26	21.1	16.07	50.93	21.2	47.20	1.18	21.3	42.94	15.48
22.0	36.30	46.26	22.1	41.27	51.95	22.1	14.96	50.70	22.2	47.04	1.09	22.3	42.56	15.65
23.0	36.25	45.93	23.1	41.05	51.67	23.1	13.93	50.50	23.2	46.90	1.01	23.3	42.21	15.81
24.0	36.20	45.62	24.1	40.84	51.42	24.1	12.91	50.31	24.2	46.75	0.95	24.3	41.89	15.96
25.0	36.14	45.32	25.1	40.61	51.18	25.1	11.85	50.14	25.2	46.60	0.90	25.3	41.59	16.14
26.0	36.08	45.02	26.1	40.36	50.96	26.1	10.75	49.99	26.2	46.45	0.87	26.3	41.29	16.34
27.0	36.01	44.71	27.1	40.08	50.72	27.1	9.57	49.83	27.2	46.28	0.85	27.3	40.97	16.54
28.0	35.94	44.38	28.1	39.79	50.46	28.1	8.34	49.67	28.2	46.11	0.82	28.3	40.63	16.76
29.0	35.87	44.03	29.1	39.51	50.17	29.1	7.07	49.48	29.2	45.94	0.78	29.3	40.26	16.97
30.0	35.80	43.65	30.1	39.23	49.86	30.1	5.80	49.25	30.2	45.75	0.71	30.3	39.87	17.17
31.0	35.73	43.26	31.1	38.98	49.53	31.1	4.57	49.01	31.2	45.57	0.62	31.3	39.46	17.36
	7.35	+7.28		16.94	+16.91		58.14	+58.13		7.38	+7.32		18.13	+18.10
	16^h 54^m	$50^s.519$		18^h 0^m	$19^s.30$		19^h 7^m	$25^s.98$		20^h 48^m	$57^s.123$		23^h 27^m	$45^s.157$
	+82° 10′	55″.32		+86° 36′	51″.09		+89° 0′	39″.69		+82° 12′	35″.90		+86° 49′	39″.43

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**39 H. Cephei.** Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Dec.	16 54	+82 10	Dec.	17 59	+86 36	Dec.	19 4	+89 0	Dec.	20 48	+82 12	Dec.	23 27	+86 50
	s	″		s	″		s	″		s	″		s	″
1.0	35.73	43.26	1.1	38.98	49.53	1.1	64.57	49.01	1.2	45.57	60.62	1.3	39.46	17.36
2.0	35.69	42.86	2.1	38.74	49.19	2.1	63.42	48.75	2.2	45.40	60.50	2.3	39.02	17.52
3.0	35.66	42.45	3.0	38.53	48.84	3.1	62.35	48.47	3.2	45.23	60.36	3.3	38.59	17.65
4.0	35.64	42.06	4.0	38.36	48.48	4.1	61.35	48.18	4.2	45.07	60.20	4.3	38.17	17.77
5.0	35.63	41.68	5.0	38.19	48.14	5.1	60.43	47.91	5.2	44.92	60.03	5.3	37.76	17.87
5.9	35.62	41.32	6.0	38.05	47.82	6.1	59.59	47.64	6.2	44.79	59.87	6.3	37.38	17.95
6.9	35.62	40.98	7.0	37.92	47.51	7.1	58.79	47.38	7.2	44.66	59.72	7.3	37.01	18.03
7.9	35.61	40.64	8.0	37.80	47.21	8.1	58.00	47.13	8.2	44.53	59.58	8.3	36.66	18.11
8.9	35.60	40.32	9.0	37.66	46.92	9.1	57.21	46.90	9.2	44.40	59.44	9.3	36.31	18.20
9.9	35.58	40.00	10.0	37.50	46.65	10.1	56.40	46.67	10.1	44.26	59.32	10.3	35.98	18.30
10.9	35.56	39.68	11.0	37.33	46.38	11.1	55.54	46.46	11.1	44.11	59.20	11.3	35.63	18.40
11.9	35.53	39.35	12.0	37.16	46.08	12.1	54.64	46.24	12.1	43.96	59.08	12.3	35.27	18.52
12.9	35.50	39.00	13.0	36.97	45.77	13.1	53.69	46.00	13.1	43.80	58.97	13.2	34.89	18.64
13.9	35.47	38.63	14.0	36.78	45.44	14.1	52.70	45.73	14.1	43.64	58.83	14.2	34.48	18.77
14.9	35.44	38.24	15.0	36.60	45.09	15.1	51.71	45.44	15.1	43.48	58.66	15.2	34.05	18.88
15.9	35.44	37.83	16.0	36.45	44.71	16.1	50.77	45.13	16.1	43.31	58.47	16.2	33.60	18.95
16.9	35.45	37.42	17.0	36.32	44.33	17.1	49.92	44.79	17.1	43.17	58.25	17.2	33.14	19.00
17.9	35.47	37.01	18.0	36.23	43.95	18.1	49.17	44.45	18.1	43.03	58.02	18.2	32.68	19.03
18.9	35.50	36.62	19.0	36.17	43.58	19.1	48.53	44.11	19.1	42.90	57.78	19.2	32.25	19.03
19.9	35.54	36.25	20.0	36.13	43.24	20.0	47.99	43.80	20.1	42.79	57.54	20.2	31.85	19.02
20.9	35.57	35.92	21.0	36.09	42.91	21.0	47.51	43.52	21.1	42.69	57.32	21.2	31.48	19.01
21.9	35.60	35.59	21.9	36.04	42.59	22.0	47.02	43.24	22.1	42.59	57.12	22.2	31.13	19.01
22.9	35.62	35.29	22.9	35.99	42.31	23.0	46.50	42.99	23.1	42.48	56.94	23.2	30.80	19.02
23.9	35.63	34.98	23.9	35.92	42.02	24.0	45.91	42.75	24.1	42.36	56.77	24.2	30.46	19.05
24.9	35.64	34.66	24.9	35.83	41.73	25.0	45.26	42.49	25.1	42.24	56.60	25.2	30.11	19.11
25.9	35.65	34.33	25.9	35.72	41.41	26.0	44.57	42.21	26.1	42.11	56.42	26.2	29.72	19.16
26.9	35.67	33.96	26.9	35.63	41.07	27.0	43.86	41.90	27.1	41.97	56.22	27.2	29.32	19.19
27.9	35.69	33.59	27.9	35.55	40.71	28.0	43.19	41.58	28.1	41.83	55.99	28.2	28.89	19.20
28.9	35.73	33.19	28.9	35.49	40.33	29.0	42.58	41.24	29.1	41.71	55.73	29.2	28.44	19.20
29.9	35.77	32.79	29.9	35.47	39.94	30.0	42.06	40.88	30.1	41.59	55.46	30.2	28.00	19.18
30.9	35.83	32.42	30.9	35.47	39.55	31.0	41.63	40.52	31.1	41.48	55.16	31.2	27.57	19.12
31.9	35.90	32.05	31.9	35.50	39.18	32.0	41.30	40.17	32.1	41.38	54.87	32.2	27.14	19.04
	7.35	+7.28		16.92	+16.89		58.03	+58.02		7.38	+7.32		18.13	+18.11
	$16^h\ 54^m$	$50^s.519$		$18^h\ 0^m$	$19^s.30$		$19^h\ 7^m$	$25^s.98$		$20^h\ 48^m$	$57^s.123$		$23^h\ 27^m$	$45^s.157$
	+82° 10′	55″.32		+86° 36′	51″.09		+89° 0′	39″.69		+82° 12′	35″.90		+86° 49′	39″.43

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	33 Piscium. Mag. 4.7				α Andromedæ. Mag. 2.2				β Cassiopeiæ. Mag. 2.4				ε Phœnicis. Mag. 3.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 0 0		° ′ − 6 11		h m 0 3		° ′ +28 36		h m 0 4		° ′ +58 40		h m 0 4		° ′ −46 13	
	s		″		s		″		s		″		s		″	
Jan. 0.2	52.71	10	43.6	5	52.62	13	44.3	9	30.29	32	27.8	7	60.10	19	55.2	4
10.2	52.61	9	44.1	4	52.49	13	43.4	11	29.97	29	27.1	12	59.91	17	54.8	9
20.2	52.52	7	44.5	2	52.36	11	42.3	13	29.68	26	25.9	17	59.74	15	53.9	13
30.1	52.45	6	44.7	1	52.25	9	41.0	15	29.42	23	24.2	20	59.59	12	52.6	18
Feb. 9.1	52.39	4	44.8	0	52.16	7	39.5	16	29.19	18	22.2	24	59.47	9	50.8	21
19.1	52.35	2	44.8	3	52.09	3	37.9	15	29.01	12	19.8	26	59.38	5	48.7	24
Mar. 1.1	52.33	2	44.5	5	52.06	0	36.4	15	28.89	5	17.2	27	59.33	1	46.3	27
11.0	52.35	5	44.0	7	52.06	4	34.9	14	28.84	2	14.5	26	59.32	4	43.6	29
21.0	52.40	8	43.3	10	52.10	9	33.5	11	28.86	10	11.9	25	59.36	8	40.7	31
31.0	52.48	12	42.3	12	52.19	13	32.4	8	28.96	19	9.4	22	59.44	14	37.6	31
Apr. 10.0	52.60	17	41.1	14	52.32	18	31.6	5	29.15	26	7.2	19	59.58	19	34.5	32
19.9	52.77	21	39.7	16	52.50	23	31.1	2	29.41	33	5.3	15	59.77	24	31.3	31
29.9	52.98	24	38.1	18	52.73	26	30.9	2	29.74	39	3.8	11	60.01	29	28.2	31
May 9.9	53.22	27	36.3	20	52.99	30	31.1	7	30.13	45	2.7	5	60.30	33	25.1	29
19.8	53.49	29	34.3	21	53.29	33	31.8	10	30.58	48	2.2	0	60.63	36	22.2	27
29.8	53.78	31	32.2	21	53.62	34	32.8	14	31.06	51	2.2	5	60.99	39	19.5	24
June 8.8	54.09	32	30.1	22	53.96	35	34.2	17	31.57	52	2.7	10	61.38	41	17.1	20
18.8	54.41	33	27.9	21	54.31	35	35.9	19	32.09	52	3.7	15	61.79	42	15.1	17
28.7	54.74	32	25.8	20	54.66	35	37.8	22	32.61	50	5.2	20	62.21	42	13.4	12
July 8.7	55.06	31	23.8	18	55.01	33	40.0	24	33.11	48	7.2	24	62.63	40	12.2	7
18.7	55.37	28	22.0	16	55.34	31	42.4	25	33.59	44	9.6	27	63.03	37	11.5	3
28.7	55.65	26	20.4	14	55.65	27	44.9	26	34.03	39	12.3	30	63.40	34	11.2	2
Aug. 7.6	55.91	22	19.0	12	55.92	24	47.5	26	34.42	33	15.3	32	63.74	30	11.4	7
17.6	56.13	19	17.8	9	56.16	20	50.1	25	34.75	28	18.5	34	64.04	25	12.1	11
27.6	56.32	15	16.9	6	56.36	16	52.6	25	35.03	22	21.9	35	64.29	20	13.2	15
Sept. 6.5	56.47	11	16.3	4	56.52	12	55.1	23	35.25	15	25.4	35	64.49	14	14.7	18
16.5	56.58	7	15.9	1	56.64	7	57.4	21	35.40	9	28.9	34	64.63	8	16.5	21
26.5	56.65	4	15.8	1	56.71	4	59.5	19	35.49	3	32.3	33	64.71	2	18.6	22
Oct. 6.5	56.69	1	15.9	4	56.75	1	61.4	17	35.52	4	35.6	31	64.73	3	20.8	23
16.4	56.70	3	16.3	5	56.76	3	63.1	14	35.48	9	38.7	28	64.70	7	23.1	22
26.4	56.67	5	16.8	5	56.73	5	64.5	12	35.39	14	41.5	25	64.63	11	25.3	21
Nov. 5.4	56.62	6	17.3	7	56.68	8	65.7	9	35.25	18	44.0	22	64.52	15	27.4	19
15.4	56.56	8	18.0	7	56.60	10	66.6	6	35.07	22	46.2	18	64.37	18	29.3	16
25.3	56.48	10	18.7	8	56.50	11	67.2	2	34.85	26	48.0	12	64.19	19	30.9	12
Dec. 5.3	56.38	10	19.5	7	56.39	12	67.4	1	34.59	28	49.2	7	64.00	19	32.1	7
15.3	56.28	10	20.2	6	56.27	13	67.3	4	34.31	30	49.9	2	63.81	20	32.8	3
25.2	56.18	10	20.8	6	56.14	13	66.9	7	34.01	31	50.1	4	63.61	20	33.1	1
35.2	56.08		21.4		56.01		66.2		33.70		49.7		63.41		33.0	
Sec δ, Tan δ	1.006		−0.109		1.139		+0.545		1.923		+1.643		1.446		−1.044	
Mean Place	$52^s.969$		39″.31		$53^s.258$		36″.47		$31^s.687$		11″.83		$59^s.884$		39″.11	
$D'_\psi \alpha$, $D_\omega \alpha$	0.00		+0.01		0.00		−0.04		0.00		−0.11		0.00		+0.07	
$D_\psi \delta$, $D_\omega \delta$	+0.4		0.0		+0.4		0.0		+0.4		0.0		+0.4		0.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**22 Andromedæ.** Mag. 5.1				**γ Pegasi.** Mag. 2.9				**σ Andromedæ.** Mag. 4.5				**ι Ceti.** Mag. 3.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	0 5		+45 35		0 8		+14 41		0 13		+36 18		0 14		− 9 17	
	s		″		s		″		s		″		s		″	
Jan. 0.2	46.73	20	30.3	8	44.82	11	63.2	8	46.04	15	21.2	8	59.58	10	86.9	5
10.2	46.53	19	29.5	12	44.71	10	62.4	9	45.89	15	20.4	11	59.48	10	87.4	3
20.2	46.34	17	28.3	16	44.61	9	61.5	10	45.74	14	19.3	14	59.38	8	87.7	2
30.1	46.17	14	26.7	19	44.52	8	60.5	10	45.60	12	17.9	17	59.30	7	87.9	0
Feb. 9.1	46.03	11	24.8	21	44.44	5	59.5	9	45.48	9	16.2	18	59.23	5	87.9	2
19.1	45.92	7	22.7	23	44.39	3	58.6	9	45.39	6	14.4	18	59.18	3	87.7	5
Mar. 1.1	45.85	2	20.4	22	44.36	0	57.7	8	45.33	2	12.6	18	59.15	0	87.2	7
11.0	45.83	3	18.2	21	44.36	4	56.9	5	45.31	3	10.8	17	59.15	3	86.5	9
21.0	45.86	9	16.1	20	44.40	8	56.4	3	45.34	8	9.1	16	59.18	7	85.6	11
31.0	45.95	15	14.1	17	44.48	13	56.1	0	45.42	13	7.5	13	59.25	11	84.5	13
Apr. 10.0	46.10	21	12.4	14	44.61	16	56.1	2	45.55	18	6.2	9	59.36	16	83.2	16
19.9	46.31	26	11.0	10	44.77	20	56.3	5	45.73	23	5.3	6	59.52	19	81.6	18
29.9	46.57	31	10.0	5	44.97	24	56.8	9	45.96	28	4.7	2	59.71	23	79.8	20
May 9.9	46.88	35	9.5	0	45.21	28	57.7	12	46.24	31	4.5	3	59.94	26	77.8	21
19.8	47.23	38	9.5	4	45.49	30	58.9	15	46.55	34	4.8	7	60.20	28	75.7	21
29.8	47.61	40	9.9	9	45.79	32	60.4	17	46.89	36	5.5	11	60.48	31	73.6	22
June 8.8	48.01	42	10.8	13	46.11	33	62.1	19	47.25	37	6.6	14	60.79	32	71.4	22
18.8	48.43	42	12.1	18	46.44	33	64.0	21	47.62	38	8.0	18	61.11	33	69.2	21
28.7	48.85	40	13.9	21	46.77	33	66.1	21	48.00	37	9.8	21	61.44	33	67.1	20
July 8.7	49.25	38	16.0	24	47.10	31	68.2	22	48.37	35	11.9	24	61.77	31	65.1	18
18.7	49.63	35	18.4	27	47.41	29	70.4	23	48.72	33	14.3	26	62.08	29	63.3	16
28.7	49.98	32	21.1	29	47.70	26	72.7	22	49.05	30	16.9	27	62.37	27	61.7	13
Aug. 7.6	50.30	28	24.0	30	47.96	23	74.9	20	49.35	26	19.6	27	62.64	24	60.4	10
17.6	50.58	23	27.0	31	48.19	20	76.9	19	49.61	22	22.3	28	62.88	20	59.4	8
27.6	50.81	18	30.1	31	48.39	16	78.8	18	49.83	18	25.1	28	63.08	16	58.6	5
Sept. 6.5	50.99	13	33.2	30	48.55	12	80.6	16	50.01	13	27.9	26	63.24	13	58.1	1
16.5	51.12	8	36.2	30	48.67	8	82.2	14	50.14	9	30.5	25	63.37	9	58.0	1
26.5	51.20	4	39.2	28	48.75	5	83.6	11	50.23	5	33.0	24	63.46	5	58.1	3
Oct. 6.5	51.24	0	42.0	26	48.80	1	84.7	9	50.28	1	35.4	21	63.51	2	58.4	5
16.4	51.24	5	44.6	23	48.81	2	85.6	7	50.29	2	37.5	19	63.53	2	58.9	7
26.4	51.19	8	46.9	20	48.79	4	86.3	4	50.27	5	39.4	16	63.51	4	59.6	8
Nov. 5.4	51.11	12	48.9	16	48.75	6	86.7	2	50.22	8	41.0	12	63.47	6	60.4	8
15.4	50.99	14	50.5	12	48.69	8	86.9	0	50.14	11	42.2	9	63.41	7	61.2	9
25.3	50.85	17	51.7	8	48.61	9	86.9	2	50.03	12	43.1	6	63.34	9	62.1	8
Dec. 5.3	50.68	18	52.5	4	48.52	10	86.7	4	49.91	14	43.7	2	63.25	10	62.9	7
15.3	50.50	19	52.9	1	48.42	10	86.3	5	49.77	15	43.9	2	63.15	10	63.6	7
25.2	50.31	19	52.8	5	48.32	11	85.8	7	49.62	15	43.7	6	63.05	11	64.3	6
35.2	50.12		52.3		48.21		85.1		49.47		43.1		62.94		64.9	
Sec δ, Tan δ	1.429		+1.021		1.034		+0.262		1.241		+0.735		1.013		−0.164	
Mean Place	47ˢ.680		17″.31		45ˢ.248		59″.77		46ˢ.740		10″.48		59ˢ.731		82″.07	
D′ψ α, Dω α	0.00		−0.07		0.00		−0.02		0.00		−0.05		0.00		+0.01	
Dψ δ, Dω δ	+0.4		0.0		+0.4		0.0		+0.4		+0.1		+0.4		+0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Tucanæ. Mag. 4.3				44 Piscium. Mag. 6.0				β Hydri. Mag. 2.9				α Phœnicis. Mag. 2.4			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	0 15		−65 22		0 20		+ 1 27		0 21		−77 44		0 21		−42 46	
	s		″		s		″		s		″		s		″	
Jan. 0.2	33.73	39	87.9	9	56.32	10	27.6	6	13.91	89	59.3	11	59.53	18	57.2	2
10.2	33.34	36	87.0	15	56.22	10	27.0	6	13.02	83	58.2	17	59.35	17	57.0	6
20.2	32.98	32	85.5	20	56.12	9	26.4	5	12.19	74	56.5	22	59.18	15	56.4	11
30.2	32.66	28	83.5	24	56.03	7	25.9	5	11.45	64	54.3	27	59.03	13	55.3	15
Feb. 9.1	32.38	22	81.1	28	55.96	6	25.4	3	10.81	53	51.6	31	58.90	10	53.8	18
19.1	32.16	15	78.3	32	55.90	4	25.1	1	10.28	39	48.5	35	58.80	7	52.0	21
Mar. 1.1	32.01	8	75.1	34	55.86	0	25.0	0	9.89	24	45.0	37	58.73	3	49.9	25
11.0	31.93	0	71.7	36	55.86	3	25.0	2	9.65	10	41.3	38	58.70	2	47.4	28
21.0	31.93	8	68.1	37	55.89	7	25.2	5	9.55	6	37.5	39	58.72	6	44.6	29
31.0	32.01	16	64.4	38	55.96	10	25.7	7	9.61	22	33.6	39	58.78	11	41.7	30
Apr. 10.0	32.17	24	60.6	37	56.06	15	26.4	10	9.83	37	29.7	38	58.89	16	38.7	31
19.9	32.41	32	56.9	36	56.21	19	27.4	12	10.20	52	25.9	37	59.05	21	35.6	32
29.9	32.73	39	53.3	34	56.40	22	28.6	15	10.72	66	22.2	34	59.26	25	32.4	31
May 9.9	33.12	46	49.9	31	56.62	26	30.1	17	11.38	79	18.8	30	59.51	30	29.3	29
19.9	33.58	52	46.8	28	56.88	29	31.8	19	12.17	89	15.8	27	59.81	34	26.4	28
29.8	34.10	57	44.0	23	57.17	30	33.7	20	13.06	99	13.1	23	60.15	36	23.6	25
June 8.8	34.67	60	41.7	19	57.47	32	35.7	20	14.05	106	10.8	17	60.51	39	21.1	22
18.8	35.27	61	39.8	15	57.79	33	37.7	21	15.11	109	9.1	12	60.90	40	18.9	19
28.7	35.88	62	38.3	9	58.12	32	39.8	21	16.20	110	7.9	6	61.30	40	17.0	14
July 8.7	36.50	61	37.4	3	58.44	31	41.9	20	17.30	109	7.3	1	61.70	38	15.6	10
18.7	37.11	57	37.1	2	58.75	29	43.9	19	18.39	104	7.2	5	62.08	37	14.6	5
28.7	37.68	53	37.3	7	59.04	26	45.8	17	19.43	96	7.7	11	62.45	34	14.1	1
Aug. 7.6	38.21	46	38.0	13	59.30	24	47.5	15	20.39	85	8.8	16	62.79	30	14.0	4
17.6	38.67	39	39.3	18	59.54	21	49.0	13	21.24	71	10.4	21	63.09	25	14.4	9
27.6	39.06	31	41.1	21	59.75	17	50.3	11	21.95	56	12.5	24	63.34	21	15.3	13
Sept. 6.6	39.37	22	43.2	24	59.92	13	51.4	8	22.51	39	14.9	27	63.55	16	16.6	16
16.5	39.59	12	45.6	27	60.05	9	52.2	6	22.90	20	17.6	29	63.71	10	18.2	19
26.5	39.71	2	48.3	28	60.14	6	52.8	3	23.10	0	20.5	30	63.81	5	20.1	21
Oct. 6.5	39.73	7	51.1	28	60.20	2	53.1	1	23.10	18	23.5	30	63.86	0	22.2	22
16.4	39.66	15	53.9	27	60.22	0	53.2	1	22.92	35	26.5	28	63.86	5	24.4	22
26.4	39.51	23	56.6	24	60.22	3	53.1	2	22.57	52	29.3	25	63.81	8	26.6	21
Nov. 5.4	39.28	30	59.0	21	60.19	5	52.9	4	22.05	66	31.8	22	63.73	12	28.7	20
15.4	38.98	35	61.1	17	60.14	7	52.5	5	21.39	77	34.0	17	63.61	15	30.7	17
25.3	38.63	38	62.8	12	60.07	8	52.0	6	20.62	85	35.7	11	63.46	16	32.4	13
Dec. 5.3	38.25	40	64.0	6	59.99	9	51.4	6	19.77	91	36.8	5	63.30	18	33.7	10
15.3	37.85	41	64.6	1	59.90	10	50.8	6	18.86	93	37.3	1	63.12	18	34.7	6
25.3	37.44	41	64.7	5	59.80	10	50.2	7	17.93	91	37.2	7	62.94	18	35.3	1
35.2	37.03		64.2		59.70		49.5		17.02		36.5		62.76		35.4	
Sec δ, Tan δ	2.401		−2.183		1.000		+0.025		4.710		−4.603		1.363		−0.925	
Mean Place	32$^{\mathrm{s}}$.892		68″.63		56$^{\mathrm{s}}$.538		28″.44		11$^{\mathrm{s}}$.823		39″.20		59$^{\mathrm{s}}$.227		42″.40	
D′ψ α, Dω α	0.00		+0.15		0.00		0.00		−0.01		+0.31		0.00		+0.06	
Dψ δ, Dω δ	+0.4		+0.1		+0.4		+0.1		+0.4		+0.1		+0.4		+0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**12 Ceti.** Mag. 6.0				**13 Ceti.** Mag. 5.2				**ζ Cassiopeiæ.** Mag. 3.7				**π Andromedæ.** Mag. 4.4			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	0 25		− 4 25		0 30		− 4 3		0 32		+53 24		0 32		+33 14	
	s		″		s		″		s		″		s		″	
Jan. 0.2	35.81		79.1		46.06		80.1		6.15		81.7		13.31		36.6	
10.2	35.71	10	79.6	5	45.96	10	80.7	6	5.90	25	81.3	4	13.17	14	35.9	7
20.2	35.61	10	80.1	5	45.86	10	81.2	5	5.65	25	80.4	9	13.02	15	35.0	9
30.2	35.52	9	80.4	3	45.77	9	81.6	4	5.41	24	79.0	14	12.88	14	33.8	12
Feb. 9.1	35.45	7	80.6	2	45.69	8	81.8	2	5.20	21	77.3	17	12.76	12	32.3	15
19.1	35.39	6	80.6	0	45.62	7	81.8	0	5.02	18	75.2	21	12.66	10	30.7	16
Mar. 1.1	35.35	4	80.5	1	45.58	4	81.7	1	4.89	13	72.9	23	12.59	7	29.1	16
11.1	35.34	1	80.1	4	45.57	1	81.3	4	4.81	8	70.5	24	12.56	3	27.5	16
21.0	35.36	2	79.5	6	45.59	2	80.7	6	4.80	1	68.1	24	12.57	1	26.0	15
31.0	35.42	6	78.7	8	45.64	5	79.9	8	4.85	5	65.8	23	12.62	5	24.6	14
Apr. 10.0	35.52	10	77.6	11	45.74	10	78.9	10	4.98	13	63.7	21	12.73	11	23.4	12
19.9	35.66	14	76.3	13	45.88	14	77.6	13	5.18	20	61.9	18	12.89	16	22.5	9
29.9	35.85	19	74.7	16	46.06	18	76.1	15	5.44	26	60.4	15	13.09	20	22.0	5
May 9.9	36.07	22	73.0	17	46.27	21	74.3	18	5.76	32	59.3	11	13.34	25	21.9	1
19.9	36.32	25	71.1	19	46.52	25	72.4	19	6.13	37	58.7	6	13.63	29	22.2	3
29.8	36.60	28	69.0	21	46.80	28	70.4	20	6.55	42	58.6	1	13.96	33	22.9	7
June 8.8	36.90	30	66.9	21	47.10	30	68.3	21	7.00	45	59.0	4	14.31	35	23.9	10
18.8	37.22	32	64.8	21	47.42	32	66.1	22	7.47	47	59.9	9	14.67	36	25.3	14
28.8	37.55	33	62.7	21	47.75	33	64.0	21	7.94	47	61.2	13	15.04	37	27.0	17
July 8.7	37.87	32	60.6	21	48.07	32	62.0	20	8.41	47	63.0	18	15.40	36	29.0	20
18.7	38.18	31	58.7	19	48.38	31	60.1	19	8.86	45	65.1	21	15.75	35	31.2	22
28.7	38.48	30	57.0	17	48.68	30	58.3	18	9.28	42	67.5	24	16.08	33	33.6	24
Aug. 7.6	38.75	27	55.5	15	48.96	28	56.8	15	9.67	39	70.3	28	16.39	31	36.1	25
17.6	38.99	24	54.2	13	49.21	25	55.5	13	10.01	34	73.3	30	16.66	27	38.7	26
27.6	39.20	21	53.2	10	49.42	21	54.4	11	10.31	30	76.4	31	16.89	23	41.3	26
Sept. 6.6	39.37	17	52.4	8	49.60	18	53.7	7	10.55	24	79.6	32	17.09	20	43.9	26
16.5	39.51	14	52.0	4	49.74	14	53.2	5	10.74	19	82.9	33	17.25	16	46.4	25
26.5	39.61	10	51.8	2	49.84	10	53.0	2	10.88	14	86.1	32	17.36	11	48.7	23
Oct. 6.5	39.67	6	51.8	0	49.91	7	53.0	0	10.96	8	89.2	31	17.44	8	50.9	22
16.5	39.70	3	52.0	2	49.94	3	53.2	2	10.99	3	92.1	29	17.48	4	52.9	20
26.4	39.70	0	52.5	5	49.94	0	53.6	4	10.97	2	94.8	27	17.48	0	54.6	17
Nov. 5.4	39.67	3	53.1	6	49.92	2	54.2	6	10.90	7	97.3	25	17.45	3	56.1	15
15.4	39.62	5	53.7	6	49.88	4	54.8	6	10.79	11	99.5	22	17.39	6	57.3	12
25.3	39.55	7	54.4	7	49.82	6	55.5	7	10.64	15	101.3	18	17.31	8	58.2	9
Dec. 5.3	39.47	8	55.2	8	49.74	8	56.3	8	10.46	18	102.6	13	17.21	10	58.8	6
15.3	39.38	9	55.9	7	49.65	9	57.0	7	10.25	21	103.4	8	17.09	12	59.0	2
25.3	39.28	10	56.6	7	49.55	10	57.7	7	10.02	23	103.8	4	16.96	13	58.9	1
35.2	39.18	10	57.2	6	49.45	10	58.3	6	9.77	25	103.7	1	16.82	14	58.4	5
Sec δ, Tan δ	1.003		−0.078		1.003		−0.071		1.678		+1.347		1.196		+0.655	
Mean Place	$35^{s}.947$		76″.33		$46^{s}.167$		77″.72		$7^{s}.076$		65″.71		$13^{s}.829$		26″.07	
D′ψ α, Dω α	0.00		+0.01		0.00		0.00		0.00		−0.09		0.00		−0.04	
Dψ δ, Dω δ	+0.4		+0.1		+0.4		+0.1		+0.4		+0.1		+0.4		+0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ε Andromedæ.** Mag. 4.5				**δ Andromedæ.** Mag. 3.5				**α Cassiopeiæ.** Var. 2.2–2.8				**μ Phœnicis.** Mag. 4.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	0 33		+28 50		0 34		+30 23		0 35		+56 3		0 37		−46 33	
	s		″		s		″		s		″		s		″	
Jan. 0.2	56.85	13	31.4	7	39.88	13	15.4	7	32.76	28	54.1	4	13.42	20	61.3	1
10.2	56.72	13	30.7	9	39.75	14	14.7	9	32.48	28	53.7	9	13.22	20	61.2	6
20.2	56.59	13	29.8	11	39.61	13	13.8	11	32.20	26	52.8	13	13.02	18	60.6	11
30.2	56.46	11	28.7	13	39.48	12	12.7	14	31.94	23	51.5	17	12.84	16	59.5	15
Feb. 9.1	56.35	10	27.4	14	39.36	9	11.3	15	31.71	20	49.8	21	12.68	14	58.0	19
19.1	56.25	7	26.0	15	39.27	7	9.8	15	31.51	15	47.7	23	12.54	10	56.1	23
Mar. 1.1	56.18	3	24.5	15	39.20	4	8.3	15	31.36	9	45.4	24	12.44	6	53.8	26
11.1	56.15	1	23.0	13	39.16	1	6.8	14	31.27	3	43.0	25	12.38	1	51.2	29
21.0	56.16	6	21.7	11	39.17	6	5.4	12	31.24	5	40.5	24	12.37	3	48.3	31
31.0	56.22	10	20.6	9	39.23	10	4.2	10	31.29	12	38.1	22	12.40	9	45.2	32
Apr. 10.0	56.32	15	19.7	7	39.33	15	3.2	7	31.41	20	35.9	20	12.49	14	42.0	33
19.9	56.47	19	19.0	3	39.48	20	2.5	4	31.61	27	33.9	16	12.63	19	38.7	33
29.9	56.66	24	18.7	1	39.68	24	2.1	0	31.88	34	32.3	12	12.82	25	35.4	32
May 9.9	56.90	28	18.8	5	39.92	28	2.1	4	32.22	39	31.1	7	13.07	29	32.2	31
19.9	57.18	31	19.3	8	40.20	32	2.5	7	32.61	43	30.4	3	13.36	34	29.1	29
29.8	57.49	34	20.1	11	40.52	34	3.2	11	33.04	47	30.1	2	13.70	37	26.2	27
June 8.8	57.83	35	21.2	15	40.86	35	4.3	15	33.51	49	30.3	8	14.07	39	23.5	24
18.8	58.18	36	22.7	18	41.21	36	5.8	17	34.00	50	31.1	12	14.46	41	21.1	19
28.8	58.54	35	24.5	20	41.57	36	7.5	20	34.50	49	32.3	17	14.87	41	19.2	15
July 8.7	58.89	34	26.5	22	41.93	35	9.5	22	34.99	48	34.0	21	15.28	41	17.7	10
18.7	59.23	32	28.7	24	42.28	33	11.7	24	35.47	45	36.1	24	15.69	39	16.7	6
28.7	59.55	30	31.1	24	42.61	30	14.1	25	35.92	41	38.5	27	16.08	36	16.1	1
Aug. 7.6	59.85	27	33.5	25	42.91	27	16.6	25	36.33	37	41.2	29	16.44	33	16.0	5
17.6	60.12	23	36.0	24	43.18	23	19.1	25	36.70	31	44.1	32	16.77	28	16.5	9
27.6	60.35	19	38.4	24	43.41	19	21.6	24	37.01	26	47.3	33	17.05	24	17.4	13
Sept. 6.6	60.54	15	40.8	23	43.60	16	24.0	23	37.27	21	50.6	33	17.29	18	18.7	17
16.5	60.69	11	43.1	21	43.76	12	26.3	22	37.48	15	53.9	33	17.47	12	20.4	21
26.5	60.80	8	45.2	19	43.88	8	28.5	20	37.63	9	57.2	32	17.59	7	22.5	23
Oct. 6.5	60.88	4	47.1	17	43.96	4	30.5	18	37.72	3	60.4	30	17.66	2	24.8	24
16.5	60.92	1	48.8	15	44.00	1	32.3	16	37.75	2	63.4	29	17.68	4	27.2	24
26.4	60.93	3	50.3	12	44.01	3	33.9	13	37.73	7	66.3	26	17.64	9	29.6	23
Nov. 5.4	60.90	5	51.5	10	43.98	5	35.2	11	37.66	12	68.9	23	17.55	12	31.9	21
15.4	60.85	7	52.5	7	43.93	7	36.3	8	37.54	16	71.2	19	17.43	15	34.0	19
25.3	60.78	9	53.2	4	43.86	10	37.1	5	37.38	20	73.1	14	17.28	18	35.9	15
Dec. 5.3	60.69	11	53.6	1	43.76	11	37.6	1	37.18	23	74.5	10	17.10	20	37.4	11
15.3	60.58	12	53.7	2	43.65	12	37.7	2	36.95	25	75.5	5	16.90	20	38.5	7
25.3	60.46	13	53.5	5	43.53	13	37.5	4	36.70	27	76.0	0	16.70	21	39.2	2
35.2	60.33		53.0		43.40		37.1		36.43		76.0		16.49		39.4	
Sec δ, Tan δ	1.142		+0.551		1.159		+0.586		1.791		+1.486		1.455		−1.056	
Mean Place	$57^{s}.295$		$22''.26$		$40^{s}.340$		$5''.70$		$33^{s}.725$		$37''.32$		$12^{s}.926$		$46''.17$	
$D'_{\psi}\,a$, $D_{\omega}\,a$	0.00		−0.04		0.00		−0.04		+0.01		−0.10		0.00		+0.07	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	+0.4		+0.1		+0.4		+0.2		+0.4		+0.2		+0.4		+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**β Ceti.** Mag. 2.2 Right Ascension.		**β Ceti.** Declination S.		**ο Cassiopeiæ.** Mag. 4.7 Right Ascension.		**ο Cassiopeiæ.** Declination N.		**21 Cassiopeiæ.** Mag. 5.6 Right Ascension.		**21 Cassiopeiæ.** Declination N.		**ζ Andromedæ.** Mag. 4.3 Right Ascension.		**ζ Andromedæ.** Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	0 39		−18 27		0 39		+47 48		0 39		+74 30		0 42		+23 47	
	s		″		s		″		s		″		s		″	
Jan. 0.3	13.49	11	57.1	4	51.58	21	45.3	4	50.80	71	65.9	0	43.13	13	46.5	7
10.2	13.38	12	57.5	2	51.37	21	44.9	9	50.09	70	65.9	6	43.00	12	45.8	8
20.2	13.26	11	57.7	1	51.16	20	44.0	13	49.39	67	65.3	11	42.88	12	45.0	10
30.2	13.15	9	57.6	4	50.96	18	42.7	16	48.72	61	64.2	17	42.76	11	44.0	11
Feb. 9.1	13.06	8	57.2	6	50.78	16	41.1	19	48.11	52	62.5	21	42.65	9	42.9	12
19.1	12.98	6	56.6	9	50.62	12	39.2	21	47.59	41	60.4	25	42.56	7	41.7	12
Mar. 1.1	12.92	2	55.7	12	50.50	7	37.1	22	47.18	29	57.9	28	42.49	3	40.5	12
11.1	12.90	1	54.5	14	50.43	1	34.9	21	46.89	14	55.1	29	42.46	0	39.3	11
21.0	12.91	4	53.1	17	50.42	5	32.8	21	46.75	2	52.2	29	42.46	4	38.2	8
31.0	12.95	8	51.4	19	50.47	10	30.7	19	46.77	17	49.3	28	42.50	9	37.4	6
Apr. 10.0	13.03	13	49.5	21	50.57	17	28.8	16	46.94	33	46.5	26	42.59	14	36.8	4
20.0	13.16	17	47.4	22	50.74	23	27.2	13	47.27	47	43.9	23	42.73	18	36.4	0
29.9	13.33	21	45.2	23	50.97	29	25.9	9	47.74	60	41.6	19	42.91	23	36.4	3
May 9.9	13.54	25	42.9	24	51.26	34	25.0	4	48.34	71	39.7	14	43.14	26	36.7	6
19.9	13.79	28	40.5	25	51.60	38	24.6	1	49.05	79	38.3	9	43.40	30	37.3	10
29.8	14.07	31	38.0	24	51.98	40	24.7	5	49.84	86	37.4	4	43.70	32	38.3	13
June 8.8	14.38	32	35.6	23	52.38	42	25.2	9	50.70	90	37.0	2	44.02	34	39.6	15
18.8	14.70	33	33.3	22	52.80	43	26.1	13	51.60	92	37.2	7	44.36	35	41.1	18
28.8	15.03	33	31.1	20	53.23	43	27.4	17	52.52	91	37.9	13	44.71	34	42.9	20
July 8.7	15.36	33	29.1	17	53.66	42	29.1	21	53.43	88	39.2	17	45.05	33	44.9	22
18.7	15.69	31	27.4	14	54.08	40	31.2	25	54.31	83	40.9	22	45.38	32	47.1	22
28.7	16.00	29	26.0	10	54.48	36	33.7	27	55.14	76	43.1	26	45.70	30	49.3	23
Aug. 7.6	16.29	26	25.0	7	54.84	32	36.4	28	55.90	68	45.7	30	46.00	26	51.6	23
17.6	16.55	23	24.3	4	55.16	28	39.2	29	56.58	59	48.7	33	46.26	23	53.9	22
27.6	16.78	19	23.9	0	55.44	24	42.1	30	57.17	48	52.0	35	46.49	20	56.1	22
Sept. 6.6	16.97	15	23.9	3	55.68	19	45.1	31	57.65	37	55.5	36	46.69	16	58.3	20
16.5	17.12	11	24.2	6	55.87	14	48.2	30	58.02	25	59.1	37	46.85	12	60.3	18
26.5	17.23	8	24.8	9	56.01	9	51.2	29	58.27	14	62.8	38	46.97	9	62.1	16
Oct. 6.5	17.31	4	25.7	11	56.10	5	54.1	27	58.41	1	66.6	37	47.06	5	63.7	15
16.5	17.35	0	26.8	12	56.15	0	56.8	25	58.42	10	70.3	35	47.11	2	65.2	12
26.4	17.35	2	28.0	13	56.15	4	59.3	22	58.32	21	73.8	33	47.13	1	66.4	10
Nov. 5.4	17.33	5	29.3	13	56.11	8	61.5	19	58.11	33	77.1	30	47.12	4	67.4	7
15.4	17.28	7	30.6	12	56.03	11	63.4	16	57.78	43	80.1	26	47.08	6	68.1	5
25.3	17.21	9	31.8	11	55.92	14	65.0	12	57.35	52	82.7	21	47.02	8	68.6	2
Dec. 5.3	17.12	10	32.9	10	55.78	17	66.2	7	56.83	59	84.8	16	46.94	10	68.8	0
15.3	17.02	11	33.9	8	55.61	19	66.9	3	56.24	65	86.4	10	46.84	11	68.8	2
25.3	16.91	12	34.7	6	55.42	21	67.2	1	55.59	69	87.4	5	46.73	11	68.6	5
35.2	16.79		35.3		55.21		67.1		54.90		87.9		46.62		68.1	
Sec δ, Tan δ	1.054		−0.334		1.489		+1.103		3.746		+3.610		1.093		+0.441	
Mean Place	13ˢ.394		50″.02		52ˢ.291		30″.35		52ˢ.886		45″.79		43ˢ.448		38″.66	
D′ψ α, Dω α	0.00		+0.02		+0.01		−0.07		+0.02		−0.24		0.00		−0.03	
Dψ δ, Dω δ	+0.4		+0.2		+0.4		+0.2		+0.4		+0.2		+0.4		+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**η Cassiopeiæ.** Mag. 3.6				**δ Piscium.** Mag. 4.6				**λ Hydri.** Mag. 5.0				**20 Ceti.** Mag. 4.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 0 43 s		° ′ +57 21 ″		h m 0 44 s		° ′ + 7 6 ″		h m 0 45 s		° ′ −75 23 ″		h m 0 48 s		° ′ − 1 36 ″	
Jan. 0.3	48.82		36.1		9.89		44.5		37.12		67.3		33.59		59.7	
		28		3		10		6		76		7		10		6
10.2	48.54		35.8		9.79		43.9		36.36		66.6		33.49		60.3	
		29		7		11		7		75		13		11		6
20.2	48.25		35.1		9.68		43.2		35.61		65.3		33.38		60.9	
		28		13		10		7		70		19		10		4
30.2	47.97		33.8		9.58		42.5		34.91		63.4		33.28		61.3	
		25		17		9		6		62		24		9		3
Feb. 9.1	47.72		32.1		9.49		41.9		34.29		61.0		33.19		61.6	
		21		20		8		5		53		28		8		1
19.1	47.51		30.1		9.41		41.4		33.76		58.2		33.11		61.7	
		17		23		5		4		43		32		6		0
Mar. 1.1	47.34		27.8		9.36		41.0		33.33		55.0		33.05		61.7	
		11		24		3		3		32		35		3		2
11.1	47.23		25.4		9.33		40.7		33.01		51.5		33.02		61.5	
		4		25		0		1		19		37		0		4
21.0	47.19		22.9		9.33		40.6		32.82		47.8		33.02		61.1	
		4		25		4		1		7		39		4		6
31.0	47.23		20.4		9.37		40.7		32.75		43.9		33.06		60.5	
		12		23		9		4		7		39		8		9
Apr. 10.0	47.35		18.1		9.46		41.1		32.82		40.0		33.14		59.6	
		19		21		13		6		21		38		12		11
20.0	47.54		16.0		9.59		41.7		33.03		36.2		33.26		58.5	
		27		17		17		9		34		37		16		14
29.9	47.81		14.3		9.76		42.6		33.37		32.5		33.42		57.1	
		34		13		21		12		46		36		20		16
May 9.9	48.15		13.0		9.97		43.8		33.83		28.9		33.62		55.5	
		40		9		24		14		58		33		24		18
19.9	48.55		12.1		10.21		45.2		34.41		25.6		33.86		53.7	
		44		4		28		16		69		29		27		20
29.8	48.99		11.7		10.49		46.8		35.10		22.7		34.13		51.7	
		48		1		30		18		77		25		29		20
June 8.8	49.47		11.8		10.79		48.6		35.87		20.2		34.42		49.7	
		51		6		32		19		85		21		31		21
18.8	49.98		12.4		11.11		50.5		36.72		18.1		34.73		47.6	
		52		11		32		20		90		16		32		21
28.8	50.50		13.5		11.43		52.5		37.62		16.5		35.05		45.5	
		51		15		33		21		92		10		33		21
July 8.7	51.01		15.0		11.76		54.6		38.54		15.5		35.38		43.4	
		50		20		32		21		92		4		32		20
18.7	51.51		17.0		12.08		56.7		39.46		15.1		35.70		41.4	
		47		24		30		20		89		2		30		18
28.7	51.98		19.4		12.38		58.7		40.35		15.3		36.00		39.6	
		44		26		28		19		84		7		28		16
Aug. 7.7	52.42		22.0		12.66		60.6		41.19		16.0		36.28		38.0	
		39		29		25		17		77		12		26		14
17.6	52.81		24.9		12.91		62.3		41.96		17.2		36.54		36.6	
		34		31		22		15		66		18		23		12
27.6	53.15		28.0		13.13		63.8		42.62		19.0		36.77		35.4	
		28		32		19		14		53		22		19		9
Sept. 6.6	53.43		31.2		13.32		65.2		43.15		21.2		36.96		34.5	
		23		33		16		11		40		26		15		6
16.5	53.66		34.5		13.48		66.3		43.55		23.8		37.11		33.9	
		17		33		12		9		25		29		12		4
26.5	53.83		37.8		13.60		67.2		43.80		26.7		37.23		33.5	
		11		32		8		7		9		30		9		1
Oct. 6.5	53.94		41.0		13.68		67.9		43.89		29.7		37.32		33.4	
		6		31		5		4		7		30		5		1
16.5	54.00		44.1		13.73		68.3		43.82		32.7		37.37		33.5	
		0		29		2		2		22		30		2		3
26.4	54.00		47.0		13.75		68.5		43.60		35.7		37.39		33.8	
		6		27		1		0		37		28		0		4
Nov. 5.4	53.94		49.7		13.74		68.5		43.23		38.5		37.39		34.2	
		11		24		3		1		49		24		3		6
15.4	53.83		52.1		13.71		68.4		42.74		40.9		37.36		34.8	
		15		20		5		2		60		20		5		7
25.4	53.68		54.1		13.66		68.2		42.14		42.9		37.31		35.5	
		19		16		7		4		69		15		7		7
Dec. 5.3	53.49		55.7		13.59		67.8		41.45		44.4		37.24		36.2	
		23		11		8		5		74		9		8		7
15.3	53.26		56.8		13.51		67.3		40.71		45.3		37.16		36.9	
		26		6		10		6		78		3		10		7
25.3	53.00		57.4		13.41		66.7		39.93		45.6		37.06		37.6	
		27		0		10		6		79		3		10		6
35.2	52.73		57.4		13.31		66.1		39.14		45.3		36.96		38.2	
Sec δ, Tan δ	1.854		+1.561		1.008		+0.125		3.966		−3.838		1.000		−0.028	
Mean Place	$49^{\mathrm{s}}.737$		18″.74		$10^{\mathrm{s}}.031$		42″.47		$34^{\mathrm{s}}.854$		48″.17		$33^{\mathrm{s}}.619$		58″.84	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	+0.01		−0.10		0.00		−0.01		−0.02		+0.26		0.00		0.00	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	+0.4		+0.2		+0.4		+0.2		+0.4		+0.2		+0.4		+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Cassiopeiæ. Mag. 2.2				μ Andromedæ. Mag. 3.9				α Sculptoris. Mag. 4.4				ε Piscium. Mag. 4.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 0 51		° ′ +60 14		h m 0 51		° ′ +38 1		h m 0 54		° ′ −29 49		h m 0 58		° ′ + 7 25	
	s		″		s		″		s		″		s		″	
Jan. 0.3	25.92		63.3		54.74		52.2		25.14		49.6		25.53		21.7	
10.2	25.60	32	63.2	1	54.58	16	51.8	4	25.00	14	50.0	4	25.43	10	21.1	6
20.2	25.27	33	62.6	6	54.41	17	51.0	8	24.86	14	50.0	0	25.32	11	20.5	6
30.2	24.95	32	61.4	12	54.25	16	49.9	11	24.73	13	49.6	4	25.21	11	19.8	7
Feb. 9.1	24.66	29	59.8	16	54.10	15	48.5	14	24.60	13	48.8	8	25.11	10	19.2	6
19.1	24.40	26	57.9	19	53.97	13	46.9	16	24.49	11	47.7	11	25.02	9	18.7	5
Mar. 1.1	24.20	20	55.6	23	53.87	10	45.2	17	24.41	8	46.3	14	24.95	7	18.3	4
11.1	24.06	14	53.1	25	53.81	6	43.4	18	24.36	5	44.6	17	24.91	4	18.0	3
21.0	24.00	6	50.6	25	53.80	1	41.7	17	24.34	2	42.6	20	24.90	1	17.9	1
31.0	24.02	2	48.0	26	53.83	3	40.1	16	24.36	2	40.3	23	24.93	3	18.0	1
Apr. 10.0	24.12	10	45.6	24	53.92	9	38.7	14	24.43	7	37.8	25	25.00	7	18.3	3
20.0	24.31	19	43.4	22	54.06	14	37.5	12	24.54	11	35.2	26	25.11	11	18.9	6
29.9	24.58	27	41.6	18	54.25	19	36.7	8	24.70	16	32.4	28	25.27	16	19.8	9
May 9.9	24.92	34	40.1	15	54.50	25	36.2	5	24.90	20	29.6	28	25.47	20	20.9	11
19.9	25.33	41	39.1	10	54.79	29	36.1	1	25.14	24	26.8	28	25.70	23	22.2	13
29.8	25.80	47	38.5	6	55.12	33	36.4	3	25.42	28	24.0	28	25.97	27	23.8	16
June 8.8	26.31	51	38.4	1	55.47	35	37.2	8	25.73	31	21.4	26	26.27	30	25.6	18
18.8	26.84	53	38.9	5	55.84	37	38.3	11	26.06	33	18.9	25	26.58	31	27.5	19
28.8	27.38	54	39.8	9	56.23	39	39.7	14	26.41	35	16.7	22	26.90	32	29.5	20
July 8.7	27.93	55	41.2	14	56.62	39	41.5	18	26.76	35	14.8	19	27.23	33	31.5	20
18.7	28.46	53	43.0	18	56.99	37	43.6	21	27.11	35	13.2	16	27.55	32	33.5	20
28.7	28.97	51	45.2	22	57.35	36	45.9	23	27.44	33	12.0	12	27.86	31	35.5	20
Aug. 7.7	29.44	47	47.8	26	57.68	33	48.3	24	27.75	31	11.3	7	28.15	29	37.4	19
17.6	29.87	43	50.7	29	57.98	30	50.9	26	28.04	29	11.0	3	28.41	26	39.1	17
27.6	30.24	37	53.8	31	58.25	27	53.5	26	28.29	25	11.1	1	28.64	23	40.7	16
Sept. 6.6	30.56	32	57.0	32	58.48	23	56.2	27	28.51	22	11.6	5	28.84	20	42.0	13
16.5	30.82	26	60.3	33	58.67	19	58.8	26	28.68	17	12.5	9	29.01	17	43.1	11
26.5	31.01	19	63.7	34	58.81	14	61.4	26	28.81	13	13.7	12	29.14	13	44.0	9
Oct. 6.5	31.14	13	67.1	34	58.91	10	63.8	24	28.90	9	15.2	15	29.24	10	44.7	7
16.5	31.20	6	70.4	33	58.98	7	66.0	22	28.95	5	16.9	17	29.30	6	45.2	5
26.4	31.20	0	73.4	30	59.01	3	68.0	20	28.96	1	18.7	18	29.33	3	45.4	2
Nov. 5.4	31.15	5	76.2	28	59.00	1	69.8	18	28.93	3	20.5	18	29.34	1	45.4	0
15.4	31.04	11	78.8	26	58.96	4	71.3	15	28.87	6	22.3	18	29.32	2	45.3	1
25.4	30.87	17	81.0	22	58.89	7	72.5	12	28.79	8	24.0	17	29.28	4	45.1	2
Dec. 5.3	30.66	21	82.7	17	58.79	10	73.4	9	28.69	10	25.5	15	29.22	6	44.7	4
15.3	30.41	25	84.0	13	58.67	12	73.9	5	28.57	12	26.7	12	29.14	8	44.2	5
25.3	30.12	29	84.8	8	58.53	14	74.0	1	28.44	13	27.6	9	29.05	9	43.7	5
35.2	29.81	31	85.0	2	58.38	15	73.8	2	28.30	14	28.2	6	28.95	10	43.1	6
Sec δ, Tan δ	2.015		+1.749		1.269		+0.782		1.153		−0.573		1.008		+0.130	
Mean Place	26ˢ.840		45″.09		55ˢ.175		39″.55		24ˢ.808		39″.57		25ˢ.585		19″.06	
D′ψ α, Dω α	+0.01		−0.11		0.00		0.05		0.00		+0.04		0.00		−0.01	
Dψ δ, Dω δ	+0.4		+0.2		+0.4		+0.2		+0.4		+0.2		+0.4		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Phœnicis. Mag. 3.4				μ Cassiopeiæ. Mag. 5.3				η Ceti. Mag. 3.6				β Andromedæ. Mag. 2.4			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	1 2		−47 10		1 2		+54 29		1 4		−10 38		1 4		+35 9	
	s		″		s		″		s		″		s		″	
Jan. 0.3	12.80	21	79.4	2	27.69	24	56.0	1	12.95	11	38.7	6	51.06	15	46.5	3
10.2	12.59	22	79.6	4	27.45	25	55.9	6	12.84	11	39.3	4	50.91	16	46.2	7
20.2	12.37	21	79.2	8	27.20	25	55.3	10	12.73	11	39.7	2	50.75	15	45.5	10
30.2	12.16	19	78.4	13	26.95	23	54.3	15	12.62	11	39.9	0	50.60	15	44.5	13
Feb. 9.2	11.97	16	77.1	18	26.72	21	52.8	19	12.51	9	39.9	2	50.45	13	43.2	14
19.1	11.81	14	75.3	22	26.51	17	50.9	21	12.42	7	39.7	4	50.32	10	41.8	15
Mar. 1.1	11.67	10	73.1	25	26.34	11	48.8	23	12.35	5	39.3	7	50.22	7	40.3	16
11.1	11.57	5	70.6	28	26.23	5	46.5	24	12.30	1	38.6	10	50.15	3	38.7	16
21.0	11.52	1	67.8	30	26.18	2	44.1	24	12.29	2	37.6	12	50.12	2	37.1	15
31.0	11.51	5	64.8	32	26.20	9	41.7	22	12.31	6	36.4	14	50.14	7	35.6	13
Apr. 10.0	11.56	10	61.6	33	26.29	16	39.5	20	12.37	10	35.0	16	50.21	12	34.3	10
20.0	11.66	16	58.3	34	26.45	24	37.5	17	12.47	14	33.4	18	50.33	18	33.3	7
29.9	11.82	21	54.9	34	26.69	31	35.8	14	12.61	19	31.6	20	50.51	23	32.6	4
May 9.9	12.03	26	51.5	33	27.00	36	34.4	10	12.80	22	29.6	22	50.74	27	32.2	0
19.9	12.29	31	48.2	31	27.36	41	33.4	5	13.02	26	27.4	23	51.01	31	32.2	3
29.9	12.60	35	45.1	28	27.77	45	32.9	0	13.28	29	25.1	23	51.32	34	32.5	7
June 8.8	12.95	38	42.3	25	28.22	48	32.9	5	13.57	31	22.8	22	51.66	36	33.2	11
18.8	13.33	40	39.8	22	28.70	49	33.4	9	13.88	32	20.6	22	52.02	37	34.3	14
28.8	13.73	41	37.6	17	29.19	50	34.3	13	14.20	33	18.4	21	52.39	38	35.7	17
July 8.7	14.14	41	35.9	13	29.69	49	35.6	18	14.53	32	16.3	19	52.77	37	37.4	20
18.7	14.55	40	34.6	8	30.18	47	37.4	21	14.85	31	14.4	16	53.14	36	39.4	22
28.7	14.95	38	33.8	3	30.65	43	39.5	24	15.16	29	12.8	14	53.50	33	41.6	23
Aug. 7.7	15.33	35	33.5	3	31.08	40	41.9	26	15.45	27	11.4	11	53.83	30	43.9	24
17.6	15.68	31	33.8	8	31.48	36	44.5	29	15.72	24	10.3	8	54.13	27	46.3	25
27.6	15.99	26	34.6	12	31.84	31	47.4	30	15.96	21	9.5	5	54.40	24	48.8	25
Sept. 6.6	16.25	21	35.8	16	32.15	26	50.4	31	16.17	17	9.0	1	54.64	20	51.3	24
16.6	16.46	16	37.4	20	32.41	20	53.5	31	16.34	13	8.9	2	54.84	16	53.7	24
26.5	16.62	10	39.4	23	32.61	15	56.6	31	16.47	10	9.1	4	55.00	12	56.1	22
Oct. 6.5	16.72	5	41.7	25	32.76	10	59.7	30	16.57	7	9.5	7	55.12	8	58.3	21
16.5	16.77	1	44.2	25	32.86	5	62.7	28	16.64	3	10.2	9	55.20	5	60.4	19
26.4	16.76	5	46.7	25	32.91	1	65.5	26	16.67	1	11.1	9	55.25	1	62.3	16
Nov. 5.4	16.71	10	49.2	23	32.90	5	68.1	23	16.68	2	12.0	10	55.26	2	63.9	14
15.4	16.61	14	51.5	21	32.85	10	70.4	19	16.66	5	13.0	11	55.24	6	65.3	11
25.4	16.47	16	53.6	18	32.75	14	72.3	16	16.61	6	14.1	10	55.18	8	66.4	8
Dec. 5.3	16.31	19	55.4	14	32.61	18	73.9	12	16.55	8	15.1	10	55.10	10	67.2	5
15.3	16.12	21	56.8	9	32.43	21	75.1	7	16.47	10	16.1	9	55.00	12	67.7	2
25.3	15.91	21	57.7	5	32.22	23	75.8	1	16.37	10	17.0	7	54.88	14	67.9	2
35.3	15.70		58.2		31.99		75.9		16.27		17.7		54.74		67.7	
Sec δ, Tan δ	1.472		−1.079		1.722		+1.402		1.018		−0.188		1.223		+0.704	
Mean Place	12ˢ.087		65″.20		28ˢ.327		38″.75		12ˢ.792		35″.20		51ˢ.359		34″.34	
D′ψ α, Dω α	−0.01		+0.07		+0.01		−0.09		0.00		+0.01		+0.01		−0.05	
Dψ δ, Dω δ	+0.4		+0.3		+0.4		+0.3		+0.4		+0.3		+0.4		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	τ Piscium. Mag. 4.7				ζ Piscium. Mag. 5.6				κ Tucanæ. Mag. 5.0				*f* Piscium. Mag. 5.3			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	1 6		+29 37		1 9		+ 7 6		1 12		−69 19		1 13		+ 3 9	
	s		″		s		″		s		″		s		″	
Jan. 0.3	51.68	13	51.4	4	11.08	10	59.0	6	51.12	54	95.2	2	18.69	10	25.3	6
10.2	51.55	14	51.0	7	10.98	11	58.4	7	50.58	53	95.0	8	18.59	11	24.7	6
20.2	51.41	14	50.3	9	10.87	11	57.7	6	50.05	51	94.2	13	18.48	11	24.1	5
30.2	51.27	14	49.4	11	10.76	11	57.1	5	49.54	47	92.9	19	18.37	11	23.6	5
Feb. 9.2	51.13	12	48.3	13	10.65	9	56.6	5	49.07	42	91.0	24	18.26	9	23.1	3
19.1	51.01	9	47.0	13	10.56	8	56.1	4	48.65	36	88.6	28	18.17	8	22.8	2
Mar. 1.1	50.92	6	45.7	14	10.48	5	55.7	3	48.29	29	85.8	32	18.09	6	22.6	1
11.1	50.86	3	44.3	13	10.43	2	55.4	1	48.00	20	82.6	35	18.03	2	22.5	1
21.1	50.83	2	43.0	12	10.41	2	55.3	1	47.80	11	79.1	36	18.01	2	22.6	4
31.0	50.85	6	41.8	10	10.43	6	55.4	4	47.69	2	75.5	38	18.03	5	23.0	6
Apr. 10.0	50.91	12	40.8	7	10.49	10	55.8	6	47.67	8	71.7	39	18.08	10	23.6	8
20.0	51.03	17	40.1	4	10.59	15	56.4	8	47.75	19	67.8	38	18.18	14	24.4	11
29.9	51.20	21	39.7	1	10.74	19	57.2	11	47.94	29	64.0	37	18.32	18	25.5	13
May 9.9	51.41	26	39.6	2	10.93	23	58.3	13	48.23	38	60.3	35	18.50	22	26.8	15
19.9	51.67	29	39.8	6	11.16	26	59.6	16	48.61	46	56.8	32	18.72	26	28.3	17
29.9	51.96	32	40.4	9	11.42	28	61.2	17	49.07	54	53.6	28	18.98	28	30.0	19
June 8.8	52.28	35	41.3	12	11.70	31	62.9	19	49.61	60	50.8	25	19.26	30	31.9	20
18.8	52.63	36	42.5	15	12.01	32	64.8	20	50.21	64	48.3	20	19.56	32	33.9	20
28.8	52.99	36	44.0	18	12.33	33	66.8	20	50.85	67	46.3	15	19.88	32	35.9	20
July 8.8	53.35	35	45.8	20	12.66	33	68.8	20	51.52	69	44.8	9	20.20	32	37.9	20
18.7	53.70	34	47.8	22	12.99	31	70.8	20	52.21	68	43.9	3	20.52	31	39.9	19
28.7	54.04	32	50.0	22	13.30	29	72.8	18	52.89	65	43.6	2	20.83	30	41.8	18
Aug. 7.7	54.36	30	52.2	23	13.59	27	74.6	17	53.54	60	43.8	8	21.13	27	43.6	16
17.6	54.66	26	54.5	23	13.86	24	76.3	15	54.14	54	44.6	14	21.40	24	45.2	13
27.6	54.92	23	56.8	23	14.10	21	77.8	13	54.68	46	46.0	19	21.64	21	46.5	11
Sept. 6.6	55.15	19	59.1	22	14.31	18	79.1	11	55.14	37	47.9	23	21.85	18	47.6	9
16.6	55.34	15	61.3	21	14.49	14	80.2	9	55.51	26	50.2	26	22.03	15	48.5	6
26.5	55.49	12	63.4	19	14.63	11	81.1	6	55.77	15	52.8	29	22.18	11	49.1	4
Oct. 6.5	55.61	8	65.3	18	14.74	7	81.7	4	55.92	5	55.7	30	22.29	8	49.5	2
16.5	55.69	5	67.1	16	14.81	5	82.1	2	55.97	7	58.7	31	22.37	5	49.7	0
26.5	55.74	2	68.7	13	14.86	2	82.3	0	55.90	17	61.8	29	22.42	2	49.7	2
Nov. 5.4	55.76	2	70.0	11	14.88	1	82.3	1	55.73	27	64.7	26	22.44	1	49.5	4
15.4	55.74	4	71.1	8	14.87	3	82.2	3	55.46	35	67.3	23	22.43	3	49.1	5
25.4	55.70	7	71.9	6	14.84	6	81.9	3	55.11	42	69.6	19	22.40	5	48.6	5
Dec. 5.3	55.63	9	72.5	3	14.78	7	81.6	5	54.69	48	71.5	14	22.35	7	48.1	6
15.3	55.54	11	72.8	0	14.71	8	81.1	6	54.21	52	72.9	8	22.28	9	47.5	7
25.3	55.43	13	72.8	2	14.63	10	80.5	6	53.69	53	73.7	3	22.19	10	46.8	6
35.3	55.30		72.6		14.53		79.9		53.16		74.0		22.09		46.2	
Sec δ, Tan δ	1.150		+0.569		1.008		+0.125		2.834		−2.652		1.001		+0.055	
Mean Place	51ˢ.902		40″.88		11ˢ.070		56″.03		49ˢ.151		77″.78		18ˢ.618		23″.65	
D′ψ α, Dω α	0.00		−0.04		0.00		−0.01		−0.02		+0.18		0.00		0.00	
Dψ δ, Dω δ	+0.4		+0.3		+0.4		+0.3		+0.4		+0.3		+0.4		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	υ Piscium. Mag. 4.7				θ Ceti. Mag. 3.8				δ Cassiopeiæ. Mag. 2.8				γ Phœnicis. Mag. 3.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	1 14		+26 48		1 19		− 8 37		1 20		+59 46		1 24		−43 45	
	s		″		s		″		s		″		s		″	
Jan. 0.3	40.72	13	35.3	4	40.68	11	57.4	6	6.30	31	79.9	3	36.09	20	62.6	4
10.3	40.59	13	34.9	6	40.57	11	58.0	5	5.99	32	80.2	3	35.89	21	63.0	1
20.2	40.46	14	34.3	9	40.46	12	58.5	3	5.67	32	79.9	8	35.68	20	62.9	5
30.2	40.32	13	33.4	10	40.34	11	58.8	1	5.35	31	79.1	13	35.48	19	62.4	10
Feb. 9.2	40.19	12	32.4	11	40.23	10	58.9	1	5.04	28	77.8	16	35.29	18	61.4	14
19.1	40.07	9	31.3	12	40.13	9	58.8	3	4.76	23	76.2	20	35.11	15	60.0	19
Mar. 1.1	39.98	7	30.1	12	40.04	6	58.5	6	4.53	18	74.2	23	34.96	12	58.1	22
11.1	39.91	3	28.9	12	39.98	3	57.9	8	4.35	11	71.9	24	34.84	8	55.9	26
21.1	39.88	1	27.7	10	39.95	1	57.1	10	4.24	3	69.5	25	34.76	4	53.3	28
31.0	39.89	5	26.7	8	39.96	4	56.1	13	4.21	5	67.0	24	34.72	2	50.5	30
Apr. 10.0	39.94	11	25.9	6	40.00	9	54.8	15	4.26	14	64.6	22	34.74	7	47.5	32
20.0	40.05	16	25.3	3	40.09	13	53.3	17	4.40	22	62.4	20	34.81	12	44.3	33
30.0	40.21	20	25.0	0	40.22	17	51.6	19	4.62	30	60.4	17	34.93	18	41.0	33
May 9.9	40.41	25	25.0	3	40.39	21	49.7	21	4.92	37	58.7	13	35.11	23	37.7	33
19.9	40.66	28	25.3	6	40.60	25	47.6	22	5.29	43	57.4	8	35.34	27	34.4	32
29.9	40.94	31	25.9	10	40.85	27	45.4	22	5.72	48	56.6	4	35.61	31	31.2	29
June 8.8	41.25	33	26.9	13	41.12	30	43.2	22	6.20	52	56.2	1	35.92	35	28.3	27
18.8	41.58	35	28.2	15	41.42	32	41.0	22	6.72	54	56.3	6	36.27	37	25.6	24
28.8	41.93	36	29.7	18	41.74	32	38.8	21	7.26	55	56.9	11	36.64	39	23.2	20
July 8.8	42.29	35	31.5	20	42.06	32	36.7	19	7.81	55	58.0	15	37.03	39	21.2	15
18.7	42.64	33	33.5	21	42.38	31	34.8	17	8.36	53	59.5	19	37.42	39	19.7	11
28.7	42.97	32	35.6	21	42.69	30	33.1	15	8.89	50	61.4	22	37.81	37	18.6	6
Aug. 7.7	43.29	30	37.7	22	42.99	28	31.6	12	9.39	46	63.6	26	38.18	35	18.0	0
17.7	43.59	26	39.9	22	43.27	25	30.4	9	9.85	42	66.2	28	38.53	31	18.0	5
27.6	43.85	23	42.1	22	43.52	21	29.5	6	10.27	37	69.0	30	38.84	27	18.5	10
Sept. 6.6	44.08	20	44.3	20	43.73	19	28.9	2	10.64	31	72.0	32	39.11	23	19.5	14
16.6	44.28	16	46.3	19	43.92	15	28.7	1	10.95	25	75.2	32	39.34	18	20.9	18
26.5	44.44	12	48.2	18	44.07	11	28.8	3	11.20	19	78.4	33	39.52	13	22.7	21
Oct. 6.5	44.56	9	50.0	16	44.18	8	29.1	5	11.39	13	81.7	32	39.65	8	24.8	23
16.5	44.65	6	51.6	14	44.26	5	29.6	8	11.52	7	84.9	30	39.73	3	27.1	25
26.5	44.71	2	53.0	12	44.31	2	30.4	9	11.59	1	87.9	29	39.76	2	29.6	25
Nov. 5.4	44.73	1	54.2	9	44.33	0	31.3	10	11.60	5	90.8	27	39.74	6	32.1	24
15.4	44.72	3	55.1	7	44.33	3	32.3	11	11.55	11	93.5	23	39.68	10	34.5	22
25.4	44.69	6	55.8	5	44.30	6	33.4	10	11.44	16	95.8	20	39.58	13	36.7	20
Dec. 5.4	44.63	8	56.3	2	44.24	7	34.4	9	11.28	21	97.8	15	39.45	16	38.7	16
15.3	44.55	10	56.5	0	44.17	9	35.3	9	11.07	25	99.3	11	39.29	18	40.3	12
25.3	44.45	11	56.5	3	44.08	11	36.2	8	10.82	29	100.4	6	39.11	20	41.5	7
35.3	44.34		56.2		43.97		37.0		10.53		101.0		38.91		42.2	
Sec δ, Tan δ	1.120		+0.505		1.012		−0.152		1.987		+1.717		1.385		−0.958	
Mean Place	$40^s.856$		25″.45		$40^s.453$		55″.19		$6^s.841$		61″.10		$35^s.284$		50″.10	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	0.00		−0.03		0.00		+0.01		+0.02		−0.11		−0.01		+0.06	
$D_\psi\,\delta$, $D_\omega\,\delta$	+0.4		+0.3		+0.4		+0.3		+0.4		+0.3		+0.4		+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	38 Cassiopeiæ. Mag. 6.0				η Piscium. Mag. 3.7				40 Cassiopeiæ. Mag. 5.5				υ Andromedæ. Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 1 24		° ′ +69 48		h m 1 26		° ′ +14 53		h m 1 31		° ′ +72 35		h m 1 31		° ′ +40 58	
	s		″		s		″		s		″		s		″	
Jan. 0.3	43.38		83.1		49.56		57.8		31.62		71.0		40.96		29.1	
10.3	42.88	50	83.6	5	49.45	11	57.3	5	31.04	58	71.7	7	40.79	17	29.1	0
20.2	42.37	51	83.6	0	49.33	12	56.7	6	30.43	61	71.8	1	40.61	18	28.7	4
30.2	41.85	52	83.0	6	49.21	12	56.0	7	29.81	62	71.3	5	40.43	18	27.9	8
Feb. 9.2	41.35	50	81.9	11	49.09	12	55.3	7	29.21	60	70.3	10	40.25	18	26.8	11
19.1	40.90	45	80.2	17	48.98	11	54.6	7	28.66	55	68.7	16	40.08	17	25.5	13
Mar. 1.1	40.51	39	78.1	21	48.89	9	53.9	7	28.19	47	66.7	20	39.94	14	23.9	16
11.1	40.21	30	75.7	24	48.82	7	53.3	6	27.82	37	64.3	24	39.83	11	22.2	17
21.1	40.01	20	73.1	26	48.79	3	52.8	5	27.56	26	61.7	26	39.76	7	20.5	17
31.0	39.92	9	70.4	27	48.79	0	52.4	4	27.43	13	58.9	28	39.74	2	18.8	17
Apr. 10.0	39.95	3	67.7	27	48.83	4	52.2	2	27.44	1	56.1	28	39.78	4	17.2	16
20.0	40.11	16	65.1	26	48.92	9	52.3	1	27.58	14	53.4	27	39.88	10	15.8	14
30.0	40.39	28	62.7	24	49.05	13	52.7	4	27.87	29	50.9	25	40.04	16	14.6	12
May 9.9	40.78	39	60.6	21	49.23	18	53.4	7	28.29	42	48.7	22	40.25	21	13.7	9
19.9	41.27	49	58.9	17	49.45	22	54.3	9	28.83	54	46.9	18	40.51	26	13.2	5
29.9	41.85	58	57.6	13	49.71	26	55.4	11	29.47	64	45.5	14	40.82	31	13.1	1
June 8.8	42.50	65	56.8	8	50.00	29	56.8	14	30.19	72	44.5	10	41.16	34	13.4	3
18.8	43.20	70	56.5	3	50.31	31	58.4	16	30.98	79	44.1	4	41.53	37	14.0	6
28.8	43.94	74	56.8	3	50.63	32	60.2	18	31.81	83	44.2	1	41.92	39	15.0	10
July 8.8	44.69	75	57.6	8	50.96	33	62.0	18	32.66	85	44.8	6	42.32	40	16.4	14
18.7	45.44	75	58.8	12	51.29	33	63.9	19	33.51	85	45.9	11	42.72	40	18.0	16
28.7	46.17	73	60.5	17	51.61	32	65.9	20	34.34	83	47.4	15	43.11	39	19.9	19
Aug. 7.7	46.86	69	62.7	22	51.92	31	67.9	20	35.14	80	49.4	20	43.48	37	22.1	22
17.7	47.50	64	65.2	25	52.20	28	69.8	19	35.88	74	51.8	24	43.82	34	24.4	23
27.6	48.08	58	68.0	28	52.46	26	71.5	17	36.56	68	54.6	28	44.14	32	26.8	24
Sept. 6.6	48.59	51	71.1	31	52.69	23	73.1	16	37.16	60	57.7	31	44.42	28	29.3	25
16.6	49.03	44	74.4	33	52.89	20	74.5	14	37.67	51	61.0	33	44.66	24	31.8	25
26.5	49.39	36	77.8	34	53.05	16	75.8	13	38.09	42	64.4	34	44.86	20	34.3	25
Oct. 6.5	49.66	27	81.3	35	53.18	13	76.9	11	38.41	32	67.9	35	45.03	17	36.8	25
16.5	49.83	17	84.8	35	53.28	10	77.8	9	38.63	22	71.5	36	45.15	12	39.1	23
26.5	49.91	8	88.3	35	53.35	7	78.4	6	38.74	11	75.0	35	45.23	8	41.3	22
Nov. 5.4	49.90	1	91.6	33	53.38	3	78.9	5	38.74	0	78.4	34	45.27	4	43.3	20
15.4	49.80	10	94.6	30	53.39	1	79.2	3	38.63	11	81.6	32	45.27	0	45.0	17
25.4	49.61	19	97.4	28	53.37	2	79.3	1	38.42	21	84.5	29	45.24	3	46.5	15
Dec. 5.4	49.34	27	99.8	24	53.33	4	79.3	0	38.11	31	87.1	26	45.18	6	47.7	12
15.3	48.99	35	101.8	20	53.27	6	79.1	2	37.71	40	89.2	21	45.08	10	48.6	9
25.3	48.58	41	103.2	14	53.19	8	78.8	3	37.23	48	90.8	16	44.95	13	49.1	5
35.3	48.11	47	104.1	9	53.09	10	78.3	5	36.69	54	91.8	10	44.80	15	49.3	2
Sec δ, Tan δ	2.900		+2.722		1.035		+0.266		3.344		+3.191		1.324		+0.868	
Mean Place	$44^{s}.152$		62″.48		$49^{s}.512$		51″.59		$32^{s}.375$		49″.85		$41^{s}.107$		14″.55	
D′ψ α, Dω α	+0.03		−0.18		0.00		−0.02		+0.03		−0.20		+0.01		−0.06	
Dψ δ, Dω δ	+0.4		+0.4		+0.4		+0.4		+0.4		+0.4		+0.4		+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*π* **Piscium.** Mag. 5.6				*υ* **Persei.** Mag. 3.8				*α* **Eridani.** Mag. 0.6				*ω* **Cassiopeiæ.** Mag. 5.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	1 32		+11 41		1 32		+48 11		1 34		−57 40		1 35		+67 36	
	s		″		s		″		s		″		s		″	
Jan. 0.3	29.16	11	53.8	5	38.47	20	32.6	1	29.88	32	57.7	3	52.30	43	33.1	6
10.3	29.05	11	53.3	6	38.27	22	32.7	3	29.56	32	58.0	2	51.87	45	33.7	1
20.2	28.94	12	52.7	6	38.05	22	32.4	8	29.24	32	57.8	8	51.42	46	33.8	5
30.2	28.82	12	52.1	7	37.83	22	31.6	11	28.92	31	57.0	13	50.96	45	33.3	11
Feb. 9.2	28.70	11	51.4	6	37.61	20	30.5	14	28.61	28	55.7	18	50.51	42	32.2	15
19.2	28.59	10	50.8	5	37.41	17	29.1	17	28.33	25	53.9	22	50.09	36	30.7	19
Mar. 1.1	28.49	7	50.3	5	37.24	13	27.4	19	28.08	20	51.7	27	49.73	29	28.8	23
11.1	28.42	4	49.8	4	37.11	8	25.5	21	27.88	15	49.0	30	49.44	20	26.5	26
21.1	28.38	1	49.4	1	37.03	3	23.4	20	27.73	9	46.0	33	49.24	10	23.9	26
31.0	28.37	4	49.3	1	37.00	3	21.4	19	27.64	3	42.7	35	49.14	1	21.3	26
Apr. 10.0	28.41	8	49.4	3	37.03	10	19.5	18	27.61	4	39.2	36	49.15	13	18.7	26
20.0	28.49	13	49.7	5	37.13	17	17.7	15	27.65	11	35.6	37	49.28	23	16.1	24
30.0	28.62	17	50.2	8	37.30	23	16.2	12	27.76	18	31.9	36	49.51	34	13.7	20
May 9.9	28.79	21	51.0	10	37.53	29	15.0	8	27.94	24	28.3	35	49.85	43	11.7	17
19.9	29.00	25	52.0	13	37.82	34	14.2	5	28.18	31	24.8	34	50.28	52	10.0	13
29.9	29.25	28	53.3	15	38.16	38	13.7	1	28.49	37	21.4	31	50.80	59	8.7	8
June 8.9	29.53	30	54.8	17	38.54	41	13.6	4	28.86	41	18.3	28	51.39	64	7.9	4
18.8	29.83	32	56.5	18	38.95	43	14.0	8	29.27	45	15.5	24	52.03	67	7.5	2
28.8	30.15	33	58.3	19	39.38	44	14.8	12	29.72	47	13.1	19	52.70	69	7.7	7
July 8.8	30.48	33	60.2	19	39.82	43	16.0	15	30.19	48	11.2	14	53.39	69	8.4	11
18.7	30.81	32	62.1	19	40.25	43	17.5	19	30.67	49	9.8	8	54.08	68	9.5	16
28.7	31.13	30	64.0	19	40.68	41	19.4	21	31.16	47	9.0	3	54.76	65	11.1	20
Aug. 7.7	31.43	29	65.9	18	41.09	38	21.5	24	31.63	44	8.7	3	55.41	61	13.1	24
17.7	31.72	26	67.7	16	41.47	35	23.9	26	32.07	40	9.0	8	56.02	56	15.5	27
27.6	31.98	23	69.3	15	41.82	31	26.5	27	32.47	35	9.8	14	56.58	49	18.2	30
Sept. 6.6	32.21	20	70.8	13	42.13	27	29.2	27	32.82	30	11.2	18	57.07	43	21.2	32
16.6	32.41	17	72.1	11	42.40	22	31.9	28	33.12	23	13.0	23	57.50	35	24.4	33
26.6	32.58	13	73.2	9	42.62	18	34.7	27	33.35	16	15.3	26	57.85	28	27.7	34
Oct. 6.5	32.71	10	74.1	6	42.80	13	37.4	27	33.51	10	17.9	28	58.13	20	31.1	34
16.5	32.81	7	74.7	4	42.93	9	40.1	26	33.61	2	20.7	28	58.33	11	34.5	34
26.5	32.88	4	75.1	3	43.02	4	42.7	24	33.63	5	23.5	29	58.44	3	37.9	32
Nov. 5.4	32.92	2	75.4	1	43.06	0	45.1	21	33.58	11	26.4	28	58.47	5	41.1	30
15.4	32.94	1	75.5	0	43.06	4	47.2	19	33.47	16	29.2	25	58.42	13	44.1	28
25.4	32.93	4	75.5	2	43.02	8	49.1	15	33.31	22	31.7	22	58.29	21	46.9	24
Dec. 5.4	32.89	6	75.3	3	42.94	12	50.6	12	33.09	26	33.9	17	58.08	28	49.3	19
15.3	32.83	8	75.0	4	42.82	16	51.8	8	32.83	29	35.6	12	57.80	35	51.2	15
25.3	32.75	10	74.6	5	42.66	18	52.6	4	32.54	31	36.8	7	57.45	40	52.7	10
35.3	32.65		74.1		42.48		53.0		32.23		37.5		57.05		53.7	
Sec δ, Tan δ	1.021		+0.207		1.500		+1.118		1.870		−1.581		2.625		+2.427	
Mean Place	29ˢ.044		48″.48		38ˢ.686		16″.04		28ˢ.506		42″.96		52ˢ.804		12″.57	
D′ψ α, Dω α	0.00		−0.01		+0.01		−0.07		−0.02		+0.10		+0.03		−0.15	
Dψ δ, Dω δ	+0.4		+0.4		+0.4		+0.4		+0.4		+0.4		+0.4		+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ν Piscium.** Mag. 4.7				**φ Persei.** Mag. 4.2				**τ Ceti.** Mag. 3.6				**ο Piscium.** Mag. 4.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	1 36		+ 5 2		1 38		+50 15		1 40		−16 23		1 40		+ 8 43	
	s		″		s		″		s		″		s		″	
Jan. 0.3	54.33	10	55.0	6	11.80	21	20.4	2	1.98	12	46.9	7	48.04	10	17.3	6
10.3	54.23	11	54.4	6	11.59	23	20.6	2	1.86	13	47.6	4	47.94	11	16.7	5
20.2	54.12	12	53.8	5	11.36	24	20.4	7	1.73	13	48.0	2	47.83	12	16.2	6
30.2	54.00	11	53.3	5	11.12	23	19.7	11	1.60	13	48.2	0	47.71	12	15.6	6
Feb. 9.2	53.89	11	52.8	4	10.89	21	18.6	14	1.47	12	48.2	4	47.59	12	15.0	5
19.2	53.78	10	52.4	3	10.68	19	17.2	17	1.35	11	47.8	7	47.47	10	14.5	4
Mar. 1.1	53.68	7	52.1	1	10.49	15	15.5	19	1.24	9	47.1	9	47.37	7	14.1	3
11.1	53.61	4	52.0	0	10.34	10	13.6	20	1.15	6	46.2	12	47.30	5	13.8	2
21.1	53.57	1	52.0	2	10.24	4	11.6	21	1.09	3	45.0	15	47.25	1	13.6	0
31.0	53.56	3	52.2	5	10.20	3	9.5	20	1.06	2	43.5	17	47.24	3	13.6	3
Apr. 10.0	53.59	7	52.7	7	10.23	10	7.5	19	1.08	6	41.8	19	47.27	7	13.9	4
20.0	53.66	12	53.4	9	10.33	16	5.6	16	1.14	10	39.9	22	47.34	12	14.3	7
30.0	53.78	16	54.3	11	10.49	23	4.0	14	1.24	15	37.7	23	47.46	16	15.0	9
May 9.9	53.94	20	55.4	14	10.72	29	2.6	10	1.39	19	35.4	24	47.62	20	15.9	12
19.9	54.14	24	56.8	16	11.01	34	1.6	6	1.58	23	33.0	25	47.82	24	17.1	14
29.9	54.38	27	58.4	17	11.35	39	1.0	2	1.81	26	30.5	25	48.06	27	18.5	16
June 8.9	54.65	30	60.1	19	11.74	42	0.8	3	2.07	29	28.0	24	48.33	30	20.1	18
18.8	54.95	31	62.0	19	12.16	44	1.1	7	2.36	31	25.6	24	48.63	31	21.9	18
28.8	55.26	32	63.9	20	12.60	46	1.8	11	2.67	32	23.2	22	48.94	32	23.7	19
July 8.8	55.58	32	65.9	19	13.06	45	2.9	14	2.99	32	21.0	20	49.26	33	25.6	19
18.7	55.90	32	67.8	19	13.51	44	4.3	18	3.31	32	19.0	17	49.59	32	27.5	19
28.7	56.22	30	69.7	18	13.95	43	6.1	21	3.63	30	17.3	13	49.91	31	29.4	18
Aug. 7.7	56.52	28	71.5	16	14.38	40	8.2	23	3.93	29	16.0	10	50.22	29	31.2	17
17.7	56.80	26	73.1	14	14.78	37	10.5	25	4.22	26	15.0	7	50.51	26	32.9	15
27.6	57.06	23	74.5	12	15.15	33	13.0	27	4.48	23	14.3	3	50.77	23	34.4	14
Sept. 6.6	57.29	20	75.7	9	15.48	28	15.7	28	4.71	20	14.0	1	51.00	21	35.8	11
16.6	57.49	17	76.6	7	15.76	24	18.5	28	4.91	17	14.1	4	51.21	17	36.9	9
26.6	57.66	14	77.3	5	16.00	19	21.3	28	5.08	13	14.5	8	51.38	14	37.8	7
Oct. 6.5	57.80	10	77.8	3	16.19	15	24.1	28	5.21	10	15.3	10	51.52	11	38.5	4
16.5	57.90	7	78.1	0	16.34	10	26.9	27	5.31	7	16.3	12	51.63	8	38.9	3
26.5	57.97	4	78.1	1	16.44	5	29.6	25	5.38	3	17.5	13	51.71	5	39.2	1
Nov. 5.4	58.01	2	78.0	3	16.49	0	32.1	22	5.41	0	18.8	14	51.76	2	39.3	1
15.4	58.03	1	77.7	4	16.49	4	34.3	20	5.41	3	20.2	14	51.78	0	39.2	2
25.4	58.02	3	77.3	5	16.45	8	36.3	17	5.38	5	21.6	14	51.78	3	39.0	3
Dec. 5.4	57.99	5	76.8	6	16.37	13	38.0	13	5.33	7	23.0	12	51.75	6	38.7	4
15.3	57.94	8	76.2	5	16.24	16	39.3	9	5.26	10	24.2	11	51.69	7	38.3	5
25.3	57.86	9	75.7	6	16.08	19	40.2	5	5.16	11	25.3	9	51.62	9	37.8	6
35.3	57.77		75.1		15.89		40.7		5.05		26.2		51.53		37.2	
Sec δ, Tan δ	1.004		+0.088		1.564		+1.202		1.042		−0.294		1.012		+0.153	
Mean Place	$54^{s}.138$		$51''.83$		$11^{s}.986$		$3''.25$		$1^{s}.548$		$42''.92$		$47^{s}.856$		$12''.74$	
$D'_\psi a$, $D_\omega a$	0.00		−0.01		+0.01		−0.07		0.00		+0.02		0.00		−0.01	
$D_\psi \delta$, $D_\omega \delta$	+0.4		+0.4		+0.4		+0.4		+0.4		+0.4		+0.4		+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ε Sculptoris.** Mag. 5.4				**ζ Ceti.** Mag. 3.9				**α Trianguli.** Mag. 3.6				**ε Cassiopeiæ.** Mag. 3.4			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	1 41		−25 28		1 47		−10 45		1 48		+29 9		1 48		+63 14	
	s		″		s		″		s		″		s		″	
Jan. 0.3	34.64	14	79.7	8	10.35	11	53.7	7	7.16	12	31.1	2	7.12	34	51.8	7
10.3	34.50	14	80.5	4	10.24	12	54.4	6	7.04	14	30.9	4	6.78	36	52.5	1
20.2	34.36	15	80.9	0	10.12	12	55.0	4	6.90	15	30.5	7	6.42	38	52.6	4
30.2	34.21	14	80.9	3	10.00	13	55.4	1	6.75	15	29.8	8	6.04	37	52.2	9
Feb. 9.2	34.07	13	80.6	6	9.87	12	55.5	1	6.60	14	29.0	10	5.67	35	51.3	14
19.2	33.94	12	80.0	10	9.75	11	55.4	4	6.46	12	28.0	11	5.32	31	49.9	18
Mar. 1.1	33.82	10	79.0	13	9.64	8	55.0	6	6.34	10	26.9	12	5.01	25	48.1	21
11.1	33.72	7	77.7	17	9.56	6	54.4	9	6.24	7	25.7	12	4.76	18	46.0	23
21.1	33.65	3	76.0	19	9.50	2	53.5	11	6.17	2	24.5	11	4.58	10	43.7	25
31.1	33.62	1	74.1	22	9.48	1	52.4	14	6.15	2	23.4	9	4.48	0	41.2	25
Apr. 10.0	33.63	6	71.9	24	9.49	6	51.0	16	6.17	7	22.5	8	4.48	9	38.7	24
20.0	33.69	10	69.5	26	9.55	10	49.4	18	6.24	13	21.7	5	4.57	18	36.3	22
30.0	33.79	15	66.9	27	9.65	15	47.6	20	6.37	17	21.2	3	4.75	28	34.1	20
May 9.9	33.94	20	64.2	27	9.80	19	45.6	21	6.54	22	20.9	0	5.03	36	32.1	16
19.9	34.14	23	61.5	28	9.99	22	43.5	23	6.76	26	20.9	3	5.39	44	30.5	13
29.9	34.37	27	58.7	27	10.21	26	41.2	23	7.02	30	21.2	7	5.83	50	29.2	8
June 8.9	34.64	30	56.0	26	10.47	29	38.9	23	7.32	33	21.9	10	6.33	54	28.4	3
18.8	34.94	32	53.4	25	10.76	30	36.6	22	7.65	35	22.9	12	6.87	58	28.1	1
28.8	35.26	33	50.9	22	11.06	32	34.4	22	8.00	35	24.1	14	7.45	60	28.2	6
July 8.8	35.59	34	48.7	19	11.38	32	32.2	20	8.35	36	25.5	17	8.05	61	28.8	11
18.8	35.93	33	46.8	15	11.70	31	30.2	17	8.71	35	27.2	19	8.66	60	29.9	15
28.7	36.26	32	45.3	11	12.01	31	28.5	15	9.06	34	29.1	20	9.26	58	31.4	19
Aug. 7.7	36.58	30	44.2	8	12.32	29	27.0	12	9.40	32	31.1	20	9.84	54	33.3	23
17.7	36.88	28	43.4	3	12.61	27	25.8	8	9.72	30	33.1	20	10.38	50	35.6	25
27.6	37.16	25	43.1	2	12.88	24	25.0	5	10.02	27	35.1	21	10.88	45	38.1	28
Sept. 6.6	37.41	21	43.3	5	13.12	21	24.5	2	10.29	23	37.2	20	11.33	40	40.9	30
16.6	37.62	17	43.8	9	13.33	17	24.3	1	10.52	20	39.2	19	11.73	34	43.9	32
26.6	37.79	14	44.7	13	13.50	14	24.4	5	10.72	16	41.1	18	12.07	27	47.1	32
Oct. 6.5	37.93	10	46.0	15	13.64	11	24.9	7	10.88	13	42.9	16	12.34	21	50.3	32
16.5	38 03	7	47.5	17	13.75	8	25.6	9	11.01	10	44.5	15	12.55	14	53.5	32
26.5	38.10	3	49.2	18	13.83	5	26.5	11	11.11	7	46.0	13	12.69	7	56.7	31
Nov. 5.5	38.13	1	51.0	19	13.88	1	27.6	12	11.18	3	47.3	11	12.76	1	59.8	29
15.4	38.12	4	52.9	18	13.89	1	28.8	12	11.21	0	48.4	9	12.75	7	62.7	26
25.4	38.08	6	54.7	17	13.88	4	30.0	12	11.21	3	49.3	7	12.68	14	65.3	23
Dec. 5.4	38.02	8	56.4	15	13.84	6	31.2	11	11.18	6	50.0	5	12.54	20	67.6	19
15.3	37.94	11	57.9	12	13.78	8	32.3	10	11.12	9	50.5	2	12.34	26	69.5	15
25.3	37.83	13	59.1	9	13.70	10	33.3	9	11.03	11	50.7	1	12.08	31	71.0	10
35.3	37.70		60.0		13.60		34.2		10.92		50.6		11.77		72.0	
Sec δ, Tan δ	1.108		−0.477		1.018		−0.190		1.145		+0.558		2.221		+1.983	
Mean Place	$34^{s}.072$		$73''.04$		$9^{s}.943$		$51''.88$		$7^{s}.092$		$19''.64$		$7^{s}.349$		$31''.86$	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	−0.01		+0.03		0.00		+0.01		+0.01		−0.03		+0.02		−0.12	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	+0.4		+0.4		+0.4		+0.5		+0.4		+0.5		+0.4		+0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ Piscium. Mag. 4.8				β Arietis. Mag. 2.7				ψ Phœnicis. Mag. 4.4				υ Ceti. Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	1 49		+ 2 45		1 49		+20 22		1 50		−46 43		1 55		−21 29	
	s		″		s		″		s		″		s		″	
Jan. 0.3	3.29	10	33.2	6	49.97	11	68.1	4	10.46	22	55.3	7	54.90	12	61.1	8
10.3	3.19	11	32.6	6	49.86	12	67.7	5	10.24	23	56.0	2	54.78	13	61.9	5
20.2	3.08	12	32.0	5	49.74	13	67.2	6	10.01	23	56.2	3	54.65	14	62.4	3
30.2	2.96	12	31.5	4	49.61	13	66.6	7	9.78	23	55.9	8	54.51	15	62.7	1
Feb. 9.2	2.84	12	31.1	3	49.48	13	65.9	8	9.55	22	55.1	13	54.36	14	62.6	5
19.2	2.72	10	30.8	2	49.35	12	65.1	9	9.33	20	53.8	18	54.22	12	62.1	8
Mar. 1.1	2.62	8	30.6	0	49.23	9	64.2	8	9.13	16	52.0	22	54.10	10	61.3	11
11.1	2.54	6	30.6	1	49.14	6	63.4	7	8.97	12	49.8	25	54.00	8	60.2	14
21.1	2.48	2	30.7	3	49.08	2	62.7	7	8.85	8	47.3	28	53.92	4	58.8	16
31.1	2.46	2	31.0	6	49.06	2	62.0	5	8.77	3	44.5	31	53.88	0	57.2	19
Apr. 10.0	2.48	6	31.6	8	49.08	7	61.5	2	8.74	3	41.4	33	53.88	4	55.3	22
20.0	2.54	11	32.4	10	49.15	12	61.3	0	8.77	8	38.1	34	53.92	9	53.1	24
30.0	2.65	15	33.4	13	49.27	16	61.3	2	8.85	14	34.7	34	54.01	13	50.7	25
May 9.9	2.80	19	34.7	15	49.43	20	61.5	5	8.99	20	31.3	34	54.14	18	48.2	26
19.9	2.99	23	36.2	16	49.63	25	62.0	8	9.19	25	27.9	33	54.32	22	45.6	26
29.9	3.22	26	37.8	18	49.88	28	62.8	10	9.44	29	24.6	31	54.54	26	43.0	27
June 8.9	3.48	29	39.6	19	50.16	31	63.8	13	9.73	34	21.5	29	54.80	28	40.3	26
18.8	3.77	31	41.5	20	50.47	33	65.1	15	10.07	37	18.6	26	55.08	31	37.7	24
28.8	4.08	32	43.5	20	50.80	34	66.6	16	10.44	39	16.0	22	55.39	32	35.3	23
July 8.8	4.40	32	45.5	19	51.14	34	68.2	18	10.83	40	13.8	17	55.71	33	33.0	20
18.8	4.72	31	47.4	19	51.48	33	70.0	19	11.23	40	12.1	12	56.04	33	31.0	16
28.7	5.03	31	49.3	17	51.81	32	71.9	19	11.63	39	10.9	7	56.37	32	29.4	13
Aug. 7.7	5.34	29	51.0	15	52.13	30	73.8	19	12.02	37	10.2	2	56.69	30	28.1	9
17.7	5.63	26	52.5	13	52.43	28	75.7	18	12.39	34	10.0	3	56.99	28	27.2	5
27.6	5.89	24	53.8	11	52.71	26	77.5	18	12.73	31	10.3	9	57.27	25	26.7	1
Sept. 6.6	6.13	21	54.9	8	52.97	22	79.3	16	13.04	26	11.2	14	57.52	22	26.6	3
16.6	6.34	18	55.7	6	53.19	19	80.9	15	13.30	21	12.6	18	57.74	19	26.9	7
26.6	6.52	15	56.3	3	53.38	16	82.4	13	13.51	17	14.4	22	57.93	15	27.6	10
Oct. 6.5	6.67	11	56.6	1	53.54	13	83.7	11	13.68	11	16.6	25	58.08	12	28.6	13
16.5	6.78	8	56.7	1	53.67	9	84.8	10	13.79	6	19.1	26	58.20	8	29.9	15
26.5	6.86	6	56.6	3	53.76	6	85.8	8	13.85	0	21.7	27	58.28	5	31.4	17
Nov. 5.5	6.92	3	56.3	4	53.82	3	86.6	6	13.85	4	24.4	26	58.33	1	33.1	18
15.4	6.95	0	55.9	6	53.85	1	87.2	4	13.81	8	27.0	25	58.34	2	34.9	17
25.4	6.95	3	55.3	6	53.86	2	87.6	2	13.73	12	29.5	22	58.32	4	36.6	16
Dec. 5.4	6.92	5	54.7	6	53.84	5	87.8	1	13.61	16	31.7	19	58.28	7	38.2	15
15.3	6.87	7	54.1	7	53.79	8	87.9	1	13.45	19	33.6	14	58.21	10	39.7	13
25.3	6.80	9	53.4	7	53.71	10	87.8	2	13.26	21	35.0	10	58.11	11	41.0	10
35.3	6.71		52.7		53.61		87.6		13.05		36.0		58.00		42.0	
Sec δ, Tan δ	1.001		+0.048		1.067		+0.372		1.459		−1.062		1.075		−0.394	
Mean Place	$3^{s}.008$		$30''.41$		$49^{s}.824$		$59''.35$		$9^{s}.387$		$43''.53$		$54^{s}.315$		$56''.22$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	0.00		0.00		0.00		−0.02		−0.01		+0.06		−0.01		+0.02	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.4		+0.5		+0.4		+0.5		+0.4		+0.5		+0.3		+0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**50 Cassiopeiæ.** Mag. 4.1				**α Hydri.** Mag. 3.0				**γ Andromedæ *pr*.** Mag. 2.3				**α Arietis.** Mag. 2.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 1 55		° ′ +71 59		h m 1 56		° ′ −61 58		h m 1 58		° ′ +41 54		h m 2 2		° ′ +23 3	
	s		″		s		″		s		″		s		″	
Jan. 0.3	58.56		84.7		3.17		108.7		33.24		61.3		16.13		15.4	
10.3	58.03	53	85.7	10	2.79	38	109.3	6	33.09	15	61.5	2	16.03	10	15.1	3
20.2	57.46	57	86.1	4	2.40	39	109.3	0	32.91	18	61.3	2	15.90	13	14.7	4
30.2	56.87	59	85.9	2	2.00	40	108.7	6	32.72	19	60.8	5	15.76	14	14.2	5
Feb. 9.2	56.28	59	85.1	8	1.61	39	107.5	12	32.53	19	60.0	8	15.62	14	13.5	7
19.2	55.72	56	83.8	13	1.25	36	105.8	17	32.34	19	58.9	11	15.48	14	12.7	8
Mar. 1.1	55.22	50	82.1	17	0.92	33	103.7	21	32.17	17	57.5	14	15.36	12	11.8	9
11.1	54.81	41	80.0	21	0.64	28	101.1	26	32.04	13	55.9	16	15.26	10	10.9	9
21.1	54.50	31	77.5	25	0.41	23	98.1	30	31.94	10	54.2	17	15.19	7	10.1	8
31.1	54.31	19	74.8	27	0.24	17	94.8	33	31.89	5	52.6	16	15.15	4	9.3	8
Apr. 10.0	54.25	6	72.1	27	0.15	9	91.3	35	31.89	0	51.0	16	15.16	1	8.7	6
20.0	54.32	7	69.4	27	0.13	2	87.7	36	31.96	7	49.5	15	15.22	6	8.3	4
30.0	54.54	22	66.8	26	0.19	6	84.0	37	32.09	13	48.2	13	15.32	10	8.1	2
May 9.9	54.89	35	64.5	23	0.33	14	80.2	38	32.27	18	47.2	10	15.47	15	8.1	0
19.9	55.35	46	62.5	20	0.55	22	76.5	37	32.51	24	46.5	7	15.67	20	8.4	3
29.9	55.92	57	60.9	16	0.85	30	73.0	35	32.80	29	46.1	4	15.91	24	9.0	6
June 8.9	56.59	67	59.7	12	1.21	36	69.8	32	33.13	33	46.1	0	16.19	28	9.8	8
18.8	57.33	74	59.0	7	1.63	42	66.9	29	33.49	36	46.5	4	16.50	31	10.9	11
28.8	58.12	79	58.7	3	2.10	47	64.4	25	33.88	39	47.2	7	16.83	33	12.2	13
July 8.8	58.95	83	59.0	3	2.61	51	62.3	21	34.28	40	48.3	11	17.17	34	13.7	15
18.8	59.79	84	59.8	8	3.14	53	60.7	16	34.69	41	49.7	14	17.51	34	15.4	17
28.7	60.62	83	61.0	12	3 67	53	59.7	10	35.09	40	51.4	17	17.85	34	17.2	18
Aug. 7.7	61.42	80	62.7	17	4.19	52	59.3	4	35.48	39	53.3	19	18.18	33	19.0	18
17.7	62.19	77	64.8	21	4.69	50	59.5	2	35.85	37	55.4	21	18.50	32	20.9	19
27.6	62.91	72	67.3	25	5.16	47	60.2	7	36.19	34	57.6	22	18.79	29	22.7	18
Sept. 6.6	63.56	65	70.1	28	5.58	42	61.5	13	36.50	31	59.9	23	19.06	27	24.5	18
16.6	64.13	57	73.1	30	5.94	36	63.3	18	36.78	28	62.3	24	19.30	24	26.2	17
26.6	64.62	49	76.4	33	6.23	29	65.6	23	37.02	24	64.7	24	19.51	21	27.8	16
Oct. 6.5	65.02	40	79.8	34	6.44	21	68.2	26	37.22	20	67.1	24	19.68	17	29.2	14
16.5	65.32	30	83.3	35	6.58	14	71.1	29	37.38	16	69.4	23	19.82	14	30.5	13
26.5	65.51	19	86.7	34	6.64	6	74.1	30	37.50	12	71.6	22	19.93	11	31.6	11
Nov. 5.5	65.60	9	90.1	34	6.61	3	77.1	30	37.58	8	73.6	20	20.01	8	32.5	9
15.4	65.59	1	93.4	33	6.51	10	80.0	29	37.63	5	75.4	18	20.06	5	33 2	7
25.4	65.47	12	96.4	30	6.34	17	82.7	27	37.63	0	77.0	16	20.07	1	33.8	6
Dec. 5.4	65.24	23	99.1	27	6.10	24	85.1	24	37.59	4	78.4	14	20.05	2	34.2	4
15.3	64.91	33	101.4	23	5.81	29	87.1	20	37.52	7	79.5	11	20.01	4	34.4	2
25.3	64.50	41	103.2	18	5.47	34	88.6	15	37.41	11	80.3	8	19.94	7	34.4	0
35.3	64.01	49	104.6	14	5.10	37	89.5	9	37.27	14	80.7	4	19.85	9	34.3	1
Sec δ, Tan δ	3.237		+3.079		2.130		−1.880		1.344		+0.898		1.087		+0.425	
Mean Place	$58^{s}.782$		$63''.32$		$1^{s}.317$		$94''.61$		$33^{s}.178$		$45''.99$		$15^{s}.924$		$5''.55$	
$D'_{\psi} a$, $D_{\omega} a$	+0.04		−0.18		−0.02		+0.11		+0.01		−0.05		+0.01		−0.02	
$D_{\psi} \delta$, $D_{\omega} \delta$	+0.3		+0.5		+0.3		+0.5		+0.3		+0.5		+0.3		+0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**β Trianguli.** Mag. 3.1				**55 Cassiopeiæ.** Mag. 6.2				**6 Persei.** Mag. 5.4				**ξ^1 Ceti.** Mag. 4.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	2 4		+34 34		2 7		+66 6		2 7		+50 39		2 8		+ 8 26	
	s		″		s		″		s		″		s		″	
Jan. 0.3	21.87	13	47.9	0	38.32	36	82.8	10	48.76	19	61.5	5	23.55	10	25.5	5
10.3	21.74	15	47.9	2	37.96	41	83.8	4	48.57	22	62.0	1	23.45	11	25.0	6
20.3	21.59	16	47.7	5	37.55	43	84.2	1	48.35	24	62.1	3	23.34	12	24.4	5
30.2	21.43	17	47.2	8	37.12	43	84.1	7	48.11	24	61.8	8	23.22	13	23.9	5
Feb. 9.2	21.26	16	46.4	10	36.69	41	83.4	12	47.87	24	61.0	11	23.09	12	23.4	4
19.2	21.10	15	45.4	11	36.28	38	82.2	16	47.63	21	59.9	15	22.97	12	23.0	4
Mar. 1.1	20.95	12	44.3	13	35.90	32	80.6	19	47.42	18	58.4	17	22.85	10	22.6	3
11.1	20.83	9	43.0	14	35.58	24	78.7	23	47.24	14	56.7	19	22.75	7	22.3	1
21.1	20.74	4	41.6	13	35.34	16	76.4	25	47.10	8	54.8	20	22.68	4	22.2	0
31.1	20.70	0	40.3	12	35.18	6	73.9	25	47.02	1	52.8	20	22.64	0	22.2	2
Apr. 10.0	20.70	6	39.1	11	35.12	5	71.4	25	47.01	6	50.8	19	22.64	5	22.4	4
20.0	20.76	11	38.0	9	35.17	16	68.9	24	47.07	12	48.9	17	22.69	9	22.8	7
30.0	20.87	17	37.1	6	35.33	26	66.5	22	47.19	19	47.2	15	22.78	13	23.5	9
May 10.0	21.04	21	36.5	4	35.59	36	64.3	19	47.38	26	45.7	12	22.91	18	24.4	11
19.9	21.25	26	36.1	0	35.95	44	62.4	15	47.64	32	44.5	9	23.09	22	25.5	13
29.9	21.51	30	36.1	3	36.39	52	60.9	11	47.96	37	43.6	5	23.31	26	26.8	15
June 8.9	21.81	33	36.4	6	36.91	58	59.8	7	48.33	41	43.1	1	23.57	28	28.3	17
18.8	22.14	36	37.0	9	37.49	62	59.1	2	48.74	43	43.0	4	23.85	30	30.0	17
28.8	22.50	37	37.9	12	38.11	65	58.9	3	49.17	45	43.4	7	24.15	32	31.7	18
July 8.8	22.87	38	39.1	15	38.76	67	59.2	8	49.62	46	44.1	11	24.47	32	33.5	19
18.8	23.25	37	40.6	17	39.43	66	60.0	12	50.08	46	45.2	14	24.79	32	35.4	18
28.7	23.62	36	42.3	19	40.09	65	61.2	16	50.54	45	46.6	18	25.11	31	37.2	18
Aug. 7.7	23.98	35	44.2	20	40.74	62	62.8	20	50.99	43	48.4	20	25.42	30	39.0	16
17.7	24.33	32	46.2	20	41.36	58	64.8	23	51.42	40	50.4	22	25.72	28	40.6	14
27.7	24.65	29	48.2	21	41.94	54	67.1	26	51.82	36	52.6	24	26.00	25	42.0	13
Sept. 6.6	24.94	26	50.3	21	42.48	48	69.7	29	52.18	33	55.0	26	26.25	23	43.3	10
16.6	25.20	23	52.4	21	42.96	41	72.6	30	52.51	29	57.6	27	26.48	20	44.3	8
26.6	25.43	20	54.5	20	43.37	35	75.6	32	52.80	24	60.3	27	26.68	17	45.1	6
Oct. 6.5	25.63	16	56.5	19	43.72	27	78.8	32	53.04	20	63.0	26	26.85	14	45.7	4
16.5	25.79	12	58.4	18	43.99	20	82.0	33	53.24	15	65.6	26	26.99	10	46.1	2
26.5	25.91	8	60.2	16	44.19	12	85.3	32	53.39	10	68.2	25	27.09	8	46.3	0
Nov. 5.5	25.99	5	61.8	14	44.31	4	88.5	30	53.49	5	70.7	23	27.17	5	46.3	1
15.4	26.04	2	63.2	13	44.35	4	91.5	28	53.54	1	73.0	21	27.22	2	46.2	2
25.4	26.06	2	64.5	10	44.31	12	94.3	25	53.55	4	75.1	18	27.24	1	46.0	4
Dec. 5.4	26.04	5	65.5	7	44.19	20	96.8	22	53.51	9	76.9	15	27.23	4	45.6	4
15.4	25.99	9	66.2	5	43.99	27	99.0	18	53.42	13	78.4	12	27.19	6	45.2	5
25.3	25.90	11	66.7	2	43.72	33	100.8	13	53.29	17	79.6	8	27.13	8	44.7	5
35.3	25.79		66.9		43.39		102.1		53.12		80.4		27.05		44.2	
Sec δ, Tan δ	1.214		+0.689		2.470		+2.259		1.577		+1.220		1.011		+0.148	
Mean Place	$21^{s}.720$		$34''.52$		$38^{s}.278$		$62''.24$		$48^{s}.663$		$43''.92$		$23^{s}.202$		$20''.25$	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	+0.01		−0.04		+0.03		−0.13		+0.02		−0.07		0.00		−0.01	
$D_\psi\,\delta$, $D_\omega\,\delta$	+0.3		+0.5		+0.3		+0.5		+0.3		+0.5		+0.3		+0.5	

Mean Solar Date.	**μ Fornacis.** Mag. 5.2				**γ Trianguli.** Mag. 4.1				**67 Ceti.** Mag. 5.7				**φ Eridani.** Mag. 3.8			
	Right Ascension.	Diff.	Declination S.	Diff.	Right Ascension.	Diff.	Declination N.	Diff.	Right Ascension.	Diff.	Declination S.	Diff.	Right Ascension.	Diff.	Declination S.	Diff.
	h m 2 9		° ′ −31 7		h m 2 12		° ′ +33 26		h m 2 12		° ′ − 6 48		h m 2 13		° ′ −51 54	
	s		″		s		″		s		″		s		″	
Jan. 0.3	5.17	14	61.7	10	8.47	12	56.4	1	39.08	10	81.3	8	25.42	26	64.2	9
10.3	5.03	16	62.7	5	8.35	14	56.5	2	38.98	12	82.1	6	25.16	27	65.1	4
20.3	4.87	17	63.2	2	8.21	16	56.3	5	38.86	13	82.7	5	24.89	28	65.5	1
30.2	4.70	17	63.4	2	8.05	17	55.8	7	38.73	13	83.2	3	24.61	28	65.4	7
Feb. 9.2	4.53	17	63.2	7	7.88	16	55.1	9	38.60	13	83.5	1	24.33	27	64.7	12
19.2	4.36	16	62.5	11	7.72	15	54.2	11	38.47	12	83.6	2	24.06	25	63.5	17
Mar. 1.2	4.20	13	61.4	14	7.57	13	53.1	12	38.35	10	83.4	4	23.81	22	61.8	22
11.1	4.07	10	60.0	17	7.44	9	51.9	13	38.25	8	83.0	6	23.59	19	59.6	25
21.1	3.97	7	58.3	21	7.35	5	50.6	12	38.17	4	82.4	9	23.40	14	57.1	29
31.1	3.90	3	56.2	24	7.30	1	49.4	12	38.13	1	81.5	11	23.26	8	54.2	32
Apr. 10.0	3.87	2	53.8	26	7.29	5	48.2	11	38.12	3	80.4	13	23.18	2	51.0	33
20.0	3.89	7	51.2	28	7.34	10	47.1	8	38.15	8	79.1	15	23.16	4	47.7	35
30.0	3.96	12	48.4	29	7.44	15	46.3	6	38.23	12	77.6	17	23.20	11	44.2	36
May 10.0	4.08	16	45.5	30	7.59	21	45.7	3	38.35	17	75.9	20	23.31	17	40.6	35
19.9	4.24	21	42.5	30	7.80	25	45.4	0	38.52	21	73.9	21	23.48	23	37.1	35
29.9	4.45	25	39.5	30	8.05	29	45.4	3	38.73	24	71.8	21	23.71	28	33.6	33
June 8.9	4.70	29	36.5	28	8.34	33	45.7	6	38.97	27	69.7	22	23.99	33	30.3	31
18.9	4.99	31	33.7	26	8.67	35	46.3	9	39.24	29	67.5	22	24.32	37	27.2	27
28.8	5.30	33	31.1	23	9.02	36	47.2	12	39.53	31	65.3	21	24.69	40	24.5	23
July 8.8	5.63	34	28.8	20	9.38	37	48.4	14	39.84	32	63.2	19	25.09	42	22.2	19
18.8	5.97	34	26.8	16	9.75	37	49.8	16	40.16	31	61.3	18	25.51	43	20.3	14
28.7	6.31	34	25.2	12	10.12	36	51.4	18	40.47	31	59.5	16	25.94	43	18.9	8
Aug. 7.7	6.65	33	24.0	7	10.48	35	53.2	19	40.78	30	57.9	13	26.37	41	18.1	3
17.7	6.98	30	23.3	3	10.83	32	55.1	20	41.08	28	56.6	10	26.78	39	17.8	3
27.7	7.28	27	23.0	2	11.15	30	57.1	20	41.36	25	55.6	7	27.17	35	18.1	9
Sept. 6.6	7.55	24	23.2	7	11.45	27	59.1	20	41.61	22	54.9	4	27.52	31	19.0	14
16.6	7.79	21	23.9	11	11.72	23	61.1	20	41.83	20	54.5	1	27.83	26	20.4	19
26.6	8.00	17	25.0	15	11.95	20	63.1	19	42.03	17	54.4	3	28.09	20	22.3	23
Oct. 6.6	8.17	13	26.5	18	12.15	17	65.0	18	42.20	14	54.7	5	28.29	15	24.6	25
16.5	8.30	9	28.3	20	12.32	13	66.8	17	42.34	10	55.2	8	28.44	9	27.1	28
26.5	8.39	5	30.3	21	12.45	9	68.5	15	42.44	7	56.0	9	28.53	3	29.9	29
Nov. 5.5	8.44	1	32.4	22	12.54	6	70.0	14	42.51	4	56.9	10	28.56	2	32.8	29
15.4	8.45	2	34.6	22	12.60	3	71.4	12	42.55	2	57.9	11	28.54	8	35.7	28
25.4	8.43	5	36.8	20	12.63	1	72.6	10	42.57	1	59.0	11	28.46	13	38.5	25
Dec. 5.4	8.38	8	38.8	18	12.62	5	73.6	7	42.56	4	60.1	11	28.33	18	41.0	21
15.4	8.30	11	40.6	16	12.57	8	74.3	5	42.52	7	61.2	10	28.15	21	43.1	17
25.3	8.19	14	42.2	12	12.49	10	74.8	2	42.45	9	62.2	9	27.94	24	44.8	13
35.3	8.05		43.4		12.39		75.0		42.36		63.1		27.70		46.1	
Sec δ, Tan δ	1.168		−0.604		1.198		+0.660		1.007		−0.120		1.621		−1.276	
Mean Place	4ˢ.355		54″.73		8ˢ.257		43″.24		38ˢ.571		81″.69		23ˢ.991		52″.73	
D′ψ α, Dω α	−0.01		+0.03		+0.01		−0.04		0.00		+0.01		−0.02		+0.07	
Dψ δ, Dω δ	+0.3		+0.5		+0.3		+0.5		+0.3		+0.5		+0.3		+0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*o* Ceti. Var. 1.7–9.6				*κ* Fornacis. Mag. 5.4				*δ* Hydri. Mag. 4.3				*ι* Cassiopeiæ. Mag. 4.6			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	2 14		− 3 21		2 18		−24 12		2 20		−69 2		2 21		+67 0	
	s		″		s		″		s		″		s		″	
Jan. 0.3	57.52		77.9		34.42		45.6		14.62		91.6		53.18		63.9	
10.3	57.42	10	78.7	8	34.30	12	46.5	9	14.08	54	92.4	8	52.81	37	65.0	11
20.3	57.31	11	79.3	6	34.16	14	47.2	7	13.52	56	92.6	2	52.39	42	65.6	6
30.2	57.19	12	79.8	5	34 00	16	47.6	4	12.95	57	92.2	4	51.95	44	65.7	1
Feb. 9.2	57.06	13	80.1	3	33.84	16	47.6	0	12.38	57	91.2	10	51.50	45	65.2	5
19.2	56.93	13	80.3	2	33.69	15	47.2	4	11.83	55	89.7	15	51.06	44	64.2	10
Mar. 1.2	56.81	12	80.3	0	33.55	14	46.4	8	11.32	51	87.6	21	50.65	41	62.8	14
11.1	56.70	11	80.1	2	33.42	13	45.3	11	10.87	45	85.1	25	50.29	36	60.9	19
21.1	56.62	8	79.7	4	33.32	10	43.9	14	10.48	39	82.2	29	50.01	28	58.7	22
31.1	56.58	4	79.0	7	33.25	7	42.2	17	10.17	31	79.0	32	49.82	19	56.3	24
Apr. 10.0	56.57	1	78.1	9	33.22	3	40.2	20	9.95	22	75.5	35	49.73	9	53.8	25
20.0	56.60	3	77.0	11	33.24	2	37.9	23	9.83	12	71.8	37	49.75	2	51.3	25
30.0	56.68	8	75.7	13	33.30	6	35.5	24	9.81	2	68.0	38	49.87	12	48.9	24
May 10.0	56.80	12	74.1	16	33.41	11	32.9	26	9.89	8	64.2	38	50.10	23	46.6	23
19.9	56.97	17	72.4	17	33.56	15	30.2	27	10.07	18	60.5	37	50.44	34	44.6	20
29.9	57.17	20	70.5	19	33.76	20	27.4	28	10.36	29	56.9	36	50.87	43	43.0	16
June 8.9	57.41	24	68.5	20	34.00	24	24.6	28	10.74	38	53.5	34	51.39	52	41.7	13
18.9	57.68	27	66.4	21	34.27	27	21.9	27	11.20	46	50.4	31	51.97	58	40.8	9
28.8	57.97	29	64.3	21	34.57	30	19.4	25	11.73	53	47.7	27	52.60	63	40.4	4
July 8.8	58.28	31	62.3	20	34.89	32	17.1	23	12.32	59	45.5	22	53.27	67	40.5	1
18.8	58.60	32	60.4	19	35.22	33	15.0	21	12.95	63	43.8	17	53.95	68	41.0	5
28.7	58.92	32	58.6	18	35.55	33	13.3	17	13.60	65	42.7	11	54.64	69	42.0	10
Aug. 7.7	59.23	31	57.0	16	35.87	32	11.9	14	14.26	66	42.1	6	55.32	68	43.4	14
17.7	59.52	29	55.6	14	36.18	31	10.9	10	14.90	64	42.1	0	55.98	66	45.2	18
27.7	59.80	28	54.5	11	36.48	30	10.4	5	15.51	61	42.8	7	56.60	62	47.3	21
Sept. 6.6	60.06	26	53.7	8	36.75	27	10.3	1	16.07	56	44.0	12	57.18	58	49.8	25
16.6	60.29	23	53.1	6	36.99	24	10.7	4	16.56	49	45.8	18	57.70	52	52.5	27
26.6	60.48	19	52.9	2	37.20	21	11.5	8	16.96	40	48.0	22	58.16	46	55.4	29
Oct. 6.6	60.65	17	53.0	1	37.37	17	12.6	11	17.27	31	50.7	27	58.56	40	58.5	31
16.5	60.79	14	53.3	3	37.51	14	14.1	15	17.48	21	53.7	30	58.88	32	61.7	32
26.5	60.90	11	53.8	5	37.61	10	15.8	17	17.59	11	56.8	31	59.12	24	65.0	33
Nov. 5.5	60.97	7	54.5	7	37.68	7	17.7	19	17.59	0	60.0	32	59.28	16	68.2	32
15.4	61.02	5	55.4	9	37.71	3	19.6	19	17.47	12	63.1	31	59.36	8	71.2	30
25.4	61.04	2	56.3	9	37.71	0	21.5	19	17.25	22	66.0	29	59.35	1	74.1	29
Dec. 5.4	61.03	1	57.3	10	37.68	3	23.4	19	16.95	30	68.6	26	59.26	9	76.8	27
15.4	61.00	3	58.3	10	37.62	6	25.1	17	16.56	39	70.8	22	59.08	18	79.1	23
25.3	60.94	6	59.2	9	37.53	9	26.6	15	16.10	46	72.5	17	58.82	26	81.0	19
35.3	60.85	9	60.0	8	37.42	11	27.8	12	15.58	52	73.7	12	58.50	32	82.4	14
Sec δ, Tan δ	1.002		−0.059		1.096		−0.450		2.797		−2.612		2.561		+2.358	
Mean Place	$57^{s}.034$		$79''.57$		$33^{s}.667$		$40''.94$		$11^{s}.784$		$78''.20$		$52^{s}.898$		$43''.19$	
$D'_{\psi}\,a$, $D_{\omega}\,a$	0.00		0.00		−0.01		+0.02		−0.04		+0.14		+0.04		−0.13	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	+0.3		+0.6		+0.3		+0.6		+0.3		+0.6		+0.3		+0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ² Ceti. Mag. 4.3				σ Ceti. Mag. 4.8				36 H. Cassiopeiæ. Mag. 5.3				ν Ceti. Mag. 5.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 2 23		° ′ + 8 4		h m 2 27		° ′ −15 37		h m 2 29		° ′ +72 26		h m 2 31		° ′ + 5 12	
	s		″		s		″		s		″		s		″	
Jan. 0.3	32.31		19.8		58.43		34.7		44.58		40.3		18.89		56.0	
10.3	32.22	9	19.3	5	58.33	10	35.7	10	44.09	49	41.7	14	18.80	9	55.4	6
20.3	32.11	11	18.8	5	58.21	12	36.4	7	43.54	55	42.6	9	18.69	11	54.8	6
30.2	31.98	13	18.3	5	58.07	14	36.9	5	42.94	60	42.9	3	18.57	12	54.3	5
Feb. 9.2	31.85	13	17.8	5	57.92	15	37.1	2	42.32	62	42.6	3	18.44	13	53.9	4
19.2	31.72	13	17.4	4	57.77	15	37.0	1	41.72	60	41.7	9	18.30	14	53.5	4
Mar. 1.2	31.60	12	17.0	4	57.64	13	36.6	4	41.16	56	40.3	14	18.17	13	53.2	3
11.1	31.49	11	16.7	3	57.52	12	35.9	7	40.67	49	38.5	18	18.06	11	53.1	1
21.1	31.40	9	16.6	1	57.42	10	34.9	10	40.27	40	36.3	22	17.97	9	53.1	0
31.1	31.35	5	16.7	1	57.35	7	33.6	13	39.98	29	33.9	24	17.91	6	53.3	2
Apr. 10.1	31.34	1	16.9	2	57.32	3	32.1	15	39.82	16	31.3	26	17.89	2	53.7	4
20.0	31.37	3	17.3	4	57.33	1	30.3	18	39.80	2	28.6	27	17.91	2	54.3	6
30.0	31.44	7	18.0	7	57.39	6	28.3	20	39.92	12	25.9	27	17.98	7	55.1	8
May 10.0	31.56	12	18.9	9	57.49	10	26.1	22	40.18	26	23.4	25	18.09	11	56.1	10
19.9	31.73	17	20.0	11	57.64	15	23.8	23	40.57	39	21.2	22	18.24	15	57.4	13
29.9	31.94	21	21.3	13	57.83	19	21.4	24	41.08	51	19.3	19	18.44	20	58.8	14
June 8.9	32.18	24	22.7	14	58.06	23	18.9	25	41.70	62	17.7	16	18.68	24	60.4	16
18.9	32.45	27	24.3	16	58.32	26	16.5	24	42.41	71	16.6	11	18.94	26	62.1	17
28.8	32.75	30	26.0	17	58.60	28	14.1	24	43.18	77	15.9	7	19.23	29	63.9	18
July 8.8	33.06	31	27.8	18	58.91	31	11.8	23	44.01	83	15.7	2	19.54	31	65.7	18
18.8	33.38	32	29.6	18	59.23	32	9.8	20	44.87	86	16.0	3	19.86	32	67.5	18
28.8	33.70	32	31.4	18	59.55	32	8.0	18	45.74	87	16.7	7	20.18	32	69.3	18
Aug. 7.7	34.02	32	33.1	17	59.86	31	6.5	15	46.60	86	17.9	12	20.49	31	70.9	16
17.7	34.32	30	34.6	15	60.16	30	5.3	12	47.44	84	19.6	17	20.79	30	72.4	15
27.7	34.61	29	36.0	14	60.45	29	4.5	8	48.24	80	21.6	20	21.08	29	73.7	13
Sept. 6.6	34.87	26	37.3	13	60.72	27	4.1	4	48.98	74	24.0	24	21.35	27	74.8	11
16.6	35.11	24	38.3	10	60.96	24	4.1	0	49.66	68	26.7	27	21.59	24	75.7	9
26.6	35.32	21	39.1	8	61.17	21	4.5	4	50.26	60	29.7	30	21.80	21	76.3	6
Oct. 6.6	35.50	18	39.6	5	61.35	18	5.2	7	50.78	52	32.8	31	21.99	19	76.7	4
16.5	35.66	16	39.9	3	61.50	15	6.2	10	51.21	43	36.1	33	22.15	16	76.9	2
26.5	35.78	12	40.0	1	61.61	11	7.4	12	51.53	32	39.4	33	22.28	13	76.8	1
Nov. 5.5	35.87	9	40.0	0	61.69	8	8.8	14	51.74	21	42.8	34	22.38	10	76.6	2
15.5	35.94	7	39.8	2	61.74	5	10.4	16	51.85	11	46.1	33	22.44	6	76.2	4
25.4	35.97	3	39.5	3	61.76	2	12.0	16	51.84	1	49.2	31	22.48	4	75.7	5
Dec. 5.4	35.97	0	39.1	4	61.75	1	13.6	16	51.71	13	52.1	29	22.49	1	75.1	6
15.4	35.95	2	38.7	4	61.71	4	15.1	15	51.47	24	54.7	26	22.47	2	74.5	6
25.3	35.90	5	38.2	5	61.65	6	16.4	13	51.13	34	56.9	22	22.43	4	73.9	6
35.3	35.82	8	37.6	6	61.56	9	17.5	11	50.70	43	58.6	17	22.36	7	73.3	6
Sec δ, Tan δ	1.010		+0.142		1.038		−0.280		3.315		+3.161		1.004		+0.091	
Mean Place	31ˢ.872		14″.27		57ˢ.750		33″.07		44ˢ.075		19″.00		18ˢ.386		51″.12	
D′ψ a, Dω a	0.00		−0.01		0.00		+0.01		+0.05		−0.17		0.00		−0.01	
Dψ δ, Dω δ	+0.3		+0.6		+0.3		+0.6		+0.3		+0.6		+0.3		+0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ **Hydri.** Mag. 5.3				ν **Arietis.** Mag. 5.4				δ **Ceti.** Mag. 4.0				ε **Hydri.** Mag. 4.3			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 2 33		° ′ −79 28		h m 2 33		° ′ +21 35		h m 2 35		° ′ − 0 2		h m 2 38		° ′ −68 37	
	s		″		s		″		s		″		s		″	
Jan. 0.3	35.21	116	93.9	8	52.82	9	18.6	2	1.88	9	43.0	7	17.78	51	94.7	10
10.3	34.05	122	94.7	2	52.73	12	18.4	3	1.79	11	43.7	6	17.27	55	95.7	5
20.3	32.83	124	94.9	4	52.61	14	18.1	4	1.68	13	44.3	5	16.72	57	96.2	1
30.2	31.59	123	94.5	10	52.47	14	17.7	5	1.55	13	44.8	4	16.15	57	96.1	7
Feb. 9.2	30.36	119	93.5	15	52.33	15	17.2	7	1.42	13	45.2	3	15.58	56	95.4	13
19.2	29.17	112	92.0	21	52.18	14	16.5	7	1.29	13	45.5	1	15.02	53	94.1	18
Mar. 1.2	28.05	102	89.9	25	52.04	12	15.8	7	1.16	12	45.6	1	14.49	48	92.3	23
11.1	27.03	89	87.4	29	51.92	10	15.1	7	1.04	9	45.5	2	14.01	42	90.0	27
21.1	26.14	74	84.5	33	51.82	6	14.4	6	0.95	6	45.3	5	13.59	35	87.3	31
31.1	25.40	58	81.2	35	51.76	2	13.8	5	0.89	3	44.8	7	13.24	27	84.2	34
Apr. 10.1	24.82	40	77.7	36	51.74	2	13.3	4	0.86	1	44.1	9	12.97	17	80.8	35
20.0	24.42	21	74.1	38	51.76	7	12.9	2	0.87	6	43.2	11	12.80	7	77.3	37
30.0	24.21	1	70.3	38	51.83	12	12.7	0	0.93	11	42.1	13	12.73	3	73.6	38
May 10.0	24.20	18	66.5	37	51.95	17	12.7	3	1.04	15	40.8	15	12.76	13	69.8	37
19.9	24.38	37	62.8	36	52.12	21	13.0	5	1.19	19	39.3	17	12.89	24	66.1	37
29.9	24.75	56	59.2	33	52.33	25	13.5	8	1.38	23	37.6	18	13.13	33	62.4	35
June 8.9	25.31	73	55.9	30	52.58	29	14.3	10	1.61	26	35.8	19	13.46	41	58.9	32
18.9	26.04	88	52.9	27	52.87	31	15.3	12	1.87	28	33.9	20	13.87	49	55.7	28
28.8	26.92	100	50.2	22	53.18	33	16.5	14	2.15	30	31.9	19	14.36	56	52.9	24
July 8.8	27.92	110	48.0	16	53.51	34	17.9	15	2.45	31	30.0	19	14.92	60	50.5	19
18.8	29.02	116	46.4	11	53.85	34	19.4	16	2.76	32	28.1	18	15.52	63	48.6	14
28.8	30.18	118	45.3	6	54.19	33	21.0	16	3.08	31	26.3	16	16.15	65	47.2	8
Aug. 7.7	31.36	118	44.7	1	54.52	32	22.6	17	3.39	30	24.7	14	16.80	64	46.4	2
17.7	32.54	114	44.8	7	54.84	31	24.3	16	3.69	29	23.3	12	17.44	61	46.2	5
27.7	33.68	105	45.5	13	55.15	29	25.9	15	3.98	27	22.1	9	18.05	57	46.7	10
Sept. 6.6	34.73	93	46.8	18	55.44	26	27.4	15	4.25	24	21.2	7	18.62	51	47.7	16
16.6	35.66	78	48.6	23	55.70	23	28.9	14	4.49	21	20.5	4	19.13	43	49.3	21
26.6	36.44	61	50.9	26	55.93	20	30.3	12	4.70	19	20.1	1	19.56	35	51.4	25
Oct. 6.6	37.05	40	53.5	30	56.13	18	31.5	11	4.89	16	20.0	1	19.91	25	53.9	29
16.5	37.45	18	56.5	32	56.31	14	32.6	9	5.05	13	20.1	4	20.16	15	56.8	32
26.5	37.63	4	59.7	32	56.45	11	33.5	8	5.18	10	20.5	6	20.31	4	60.0	32
Nov. 5.5	37.59	26	62.9	32	56.56	8	34.3	6	5.28	7	21.1	7	20.35	6	63.2	32
15.5	37.33	47	66.1	30	56.64	5	34.9	5	5.35	4	21.8	8	20.29	17	66.4	30
25.4	36.86	67	69.1	26	56.69	2	35.4	3	5.39	1	22.6	8	20.12	27	69.4	28
Dec. 5.4	36.19	85	71.7	22	56.71	1	35.7	2	5.40	2	23.4	9	19.85	35	72.2	24
15.4	35.34	99	73.9	18	56.70	5	35.9	1	5.38	5	24.3	8	19.50	42	74.6	20
25.3	34.35	111	75.7	12	56.65	8	36.0	1	5.33	7	25.1	8	19.08	49	76.6	14
35.3	33.24		76.9		56.57		35.9		5.26		25.9		18.59		78.0	
Sec δ, Tan δ	5.481		−5.389		1.075		+0.396		1.000		−0.001		2.746		−2.557	
Mean Place	29^s.124		80″.83		52^s.400		8″.62		1^s.315		46″.27		14^s.807		82″.58	
$D'_\psi \alpha$, $D_\omega \alpha$	−0.09		+0.28		+0.01		−0.02		0.00		0.00		−0.04		+0.13	
$D_\psi \delta$, $D_\omega \delta$	+0.3		+0.6		+0.3		+0.6		+0.3		+0.6		+0.3		+0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Persei. Mag. 4.2				γ Ceti *seq.* Mag. 3.7				π Ceti. Mag. 4.4				μ Ceti. Mag. 4.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	2 38		+48 51		2 38		+ 2 52		2 39		−14 13		2 40		+ 9 44	
	s		″		s		″		s		″		s		″	
Jan. 0.3	15.43	16	57.5	7	48.01	9	15.2	7	59.58	10	36.6	11	14.72	9	57.3	4
10.3	15.27	20	58.2	4	47.92	11	14.5	6	59.48	12	37.7	8	14.63	11	56.9	5
20.3	15.07	22	58.6	0	47.81	12	13.9	5	59.36	14	38.5	5	14.52	12	56.4	5
30.3	14.85	24	58.6	5	47.69	13	13.4	4	59.22	14	39.0	2	14.40	13	55.9	5
Feb. 9.2	14.61	23	58.1	8	47.56	14	13.0	3	59.08	15	39.2	0	14.27	14	55.4	4
19.2	14.38	22	57.3	12	47.42	13	12.7	2	58.93	14	39.2	3	14.13	13	55.0	4
Mar. 1.2	14.16	20	56.1	14	47.29	12	12.5	0	58.79	13	38.9	6	14.00	12	54.6	3
11.1	13.96	16	54.7	16	47.17	10	12.5	1	58.66	11	38.3	9	13.88	10	54.3	2
21.1	13.80	11	53.1	18	47.07	6	12.6	3	58.55	8	37.4	11	13.78	6	54.1	0
31.1	13.69	5	51.3	18	47.01	3	12.9	5	58.47	4	36.3	14	13.72	3	54.1	1
Apr. 10.1	13.64	1	49.5	18	46.98	2	13.4	7	58.43	0	34.9	17	13.69	1	54.2	3
20.0	13.65	8	47.7	17	47.00	6	14.1	9	58.43	5	33.2	19	13.70	6	54.5	5
30.0	13.73	15	46.0	15	47.06	10	15.0	11	58.48	9	31.3	21	13.76	11	55.0	8
May 10.0	13.88	21	44.5	13	47.16	14	16.1	14	58.57	14	29.2	22	13.87	15	55.8	10
20.0	14.09	27	43.2	10	47.30	19	17.5	15	58.71	18	27.0	24	14.02	20	56.8	11
29.9	14.36	33	42.2	6	47.49	23	19.0	16	58.89	22	24.6	24	14.22	23	57.9	13
June 8.9	14.69	37	41.6	3	47.72	26	20.6	18	59.11	25	22.2	24	14.45	26	59.2	15
18.9	15.06	41	41.3	1	47.98	28	22.4	19	59.36	28	19.8	24	14.71	29	60.7	16
28.8	15.47	43	41.4	4	48.26	30	24.3	19	59.64	30	17.4	23	15.00	31	62.3	17
July 8.8	15.90	44	41.8	8	48.56	32	26.2	18	59.94	31	15.1	21	15.31	32	64.0	17
18.8	16.34	45	42.6	11	48.88	32	28.0	17	60.25	32	13.0	18	15.63	32	65.7	17
28.8	16.79	45	43.7	14	49.20	31	29.7	16	60.57	31	11.2	15	15.95	32	67.4	16
Aug. 7.7	17.24	44	45.1	17	49.51	30	31.3	15	60.88	31	9.7	12	16.27	31	69.0	15
17.7	17.68	41	46.8	19	49.81	29	32.8	13	61.19	29	8.5	9	16.58	30	70.5	14
27.7	18.09	38	48.7	21	50.10	27	34.1	10	61.48	27	7.6	5	16.88	27	71.9	12
Sept. 6.7	18.47	36	50.8	22	50.37	25	35.1	7	61.75	25	7.1	1	17.15	25	73.1	10
16.6	18.83	32	53.0	24	50.62	22	35.8	5	62.00	22	7.0	3	17.40	23	74.1	9
26.6	19.15	28	55.4	24	50.84	19	36.3	3	62.22	19	7.3	6	17.63	20	75.0	6
Oct. 6.6	19.43	24	57.8	24	51.03	16	36.6	0	62.41	16	7.9	9	17.83	17	75.6	4
16.5	19.67	19	60.2	24	51.19	13	36.6	2	62.57	13	8.8	12	18.00	14	76.0	2
26.5	19.86	15	62.6	23	51.32	11	36.4	4	62.70	9	10.0	14	18.14	11	76.2	0
Nov. 5.5	20.01	11	64.9	22	51.43	8	36.0	6	62.79	6	11.4	15	18.25	8	76.2	2
15.5	20.12	6	67.1	21	51.51	4	35.4	6	62.85	4	12.9	16	18.33	5	76.0	2
25.4	20.18	0	69.2	18	51.55	1	34.8	7	62.89	0	14.5	16	18.38	2	75.8	3
Dec. 5.4	20.18	4	71.0	16	51.56	1	34.1	8	62.89	3	16.1	15	18.40	1	75.5	4
15.4	20.14	9	72.6	13	51.55	4	33.3	7	62.86	6	17.6	13	18.39	4	75.1	5
25.4	20.05	14	73.9	10	51.51	7	32.6	7	62.80	8	18.9	12	18.35	6	74.6	5
35.3	19.91		74.9		51.44		31.9		62.72		20.1		18.29		74.1	
Sec δ, Tan δ	1.520		+1.145		1.001		+0.050		1.032		−0.254		1.015		+0.172	
Mean Place	$15^{s}.027$		40″.32		$47^{s}.453$		10″.89		$58^{s}.854$		35″.87		$14^{s}.196$		50″.84	
D′ψ α, Dω α	+0.02		−0.06		0.00		0.00		0.00		+0.01		0.00		−0.01	
Dψ δ, Dω δ	+0.3		+0.6		+0.3		+0.6		+0.3		+0.6		+0.3		+0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	η Persei. Mag. 3.9				41 Arietis. Mag. 3.7				β Fornacis. Mag. 4.5				σ Arietis. Mag. 5.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	2 44		+55 32		2 44		+26 54		2 45		−32 45		2 46		+14 43	
	s		″		s		″		s		″		s		″	
Jan. 0.3	21.00		25.3		52.00		21.0		28.01		80.8		41.72		34.7	
10.3	20.81	19	26.3	10	51.90	10	21.0	0	27.87	14	82.1	13	41.64	8	34.4	3
20.3	20.57	24	26.9	6	51.78	12	20.8	2	27.71	16	83.0	9	41.53	11	34.0	4
30.3	20.30	27	27.0	1	51.64	14	20.5	3	27.53	18	83.5	5	41.41	12	33.6	4
Feb. 9.2	20.01	29	26.7	3	51.49	15	20.1	4	27.34	19	83.5	0	41.27	14	33.1	5
19.2	19.72	29	26.0	7	51.33	16	19.5	6	27.15	19	83.1	4	41.12	15	32.6	5
Mar. 1.2	19.45	27	24.8	12	51.18	15	18.7	8	26.97	18	82.2	9	40.98	14	32.1	5
11.1	19.20	25	23.3	15	51.04	14	17.8	9	26.80	17	81.0	12	40.86	12	31.6	5
21.1	19.00	20	21.6	17	50.93	11	16.9	9	26.65	15	79.4	16	40.76	10	31.2	4
31.1	18.85	15	19.6	20	50.85	8	16.1	8	26.54	11	77.4	20	40.69	7	31.0	2
Apr. 10.1	18.77	8	17.5	21	50.82	3	15.3	8	26.47	7	75.1	23	40.65	4	30.9	1
20.0	18.77	0	15.4	21	50.83	1	14.6	7	26.45	2	72.6	25	40.66	1	30.9	0
30.0	18.84	7	13.4	20	50.89	6	14.1	5	26.47	2	69.8	28	40.72	6	31.1	2
May 10.0	18.99	15	11.6	18	51.00	11	13.8	3	26.54	7	66.9	29	40.82	10	31.5	4
20.0	19.22	23	10.0	16	51.17	17	13.7	1	26.66	12	63.9	30	40.97	15	32.1	6
29.9	19.52	30	8.6	14	51.38	21	13.9	2	26.83	17	60.8	31	41.16	19	32.9	8
June 8.9	19.88	36	7.6	10	51.63	25	14.3	4	27.05	22	57.7	31	41.39	23	34.0	11
18.9	20.29	41	7.0	6	51.92	29	15.0	7	27.31	26	54.8	29	41.66	27	35.2	12
28.8	20.74	45	6.8	2	52.24	32	15.9	9	27.60	29	52.0	28	41.96	30	36.6	14
July 8.8	21.22	48	6.9	1	52.57	33	17.0	11	27.91	31	49.5	25	42.27	31	38.1	15
18.8	21.72	50	7.4	5	52.92	35	18.3	13	28.24	33	47.3	22	42.59	32	39.7	16
28.8	22.23	51	8.3	9	53.27	35	19.8	15	28.58	34	45.4	19	42.92	33	41.3	16
Aug. 7.7	22.74	51	9.6	13	53.62	35	21.3	15	28.92	34	44.0	14	43.24	32	42.9	16
17.7	23.23	49	11.2	16	53.96	34	22.9	16	29.26	34	43.1	9	43.56	32	44.4	15
27.7	23.70	47	13.0	18	54.28	32	24.5	16	29.58	32	42.7	4	43.86	30	45.9	15
Sept. 6.7	24.15	45	15.1	21	54.59	31	26.2	17	29.88	30	42.7	0	44.14	28	47.2	13
16.6	24.56	41	17.4	23	54.87	28	27.8	16	30.15	27	43.2	5	44.40	26	48.4	12
26.6	24.93	37	19.9	25	55.12	25	29.3	15	30.39	24	44.2	10	44.64	24	49.4	10
Oct. 6.6	25.25	32	22.5	26	55.34	22	30.7	14	30.60	21	45.7	15	44.85	21	50.2	8
16.5	25.53	28	25.2	27	55.53	19	32.0	13	30.77	17	47.5	18	45.03	18	50.9	7
26.5	25.76	23	27.9	27	55.69	16	33.2	12	30.90	13	49.6	21	45.18	15	51.4	5
Nov. 5.5	25.94	18	30.5	26	55.82	13	34.3	11	30.99	9	51.9	23	45.30	12	51.7	3
15.5	26.06	12	33.0	25	55.92	10	35.2	9	31.04	5	54.3	24	45.39	9	51.9	2
25.4	26.12	6	35.4	24	55.98	6	36.0	8	31.05	1	56.7	24	45.45	6	51.9	0
Dec. 5.4	26.12	0	37.6	22	56.01	3	36.6	6	31.03	2	59.0	23	45.48	3	51.8	1
15.4	26.07	5	39.6	20	56.00	1	37.1	5	30.97	6	61.1	21	45.47	1	51.7	1
25.4	25.96	11	41.2	16	55.96	4	37.4	3	30.88	9	63.0	19	45.43	4	51.5	2
35.3	25.79	17	42.4	12	55.89	7	37.6	2	30.75	13	64.5	15	45.37	6	51.1	4
Sec δ, Tan δ	1.767		+1.457		1.121		+0.507		1.189		−0.644		1.034		+0.263	
Mean Place	20ˢ.514		6″.75		51ˢ.533		9″.31		26ˢ.968		75″.34		41ˢ.196		26″.58	
D′ψ α, Dω α	+0.03		−0.07		+0.01		−0.03		−0.01		+0.03		0.00		−0.01	
Dψ δ, Dω δ	+0.3		+0.7		+0.3		+0.7		+0.3		+0.7		+0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**τ^2 Eridani.** Mag. 4.8				**τ Persei.** Mag. 4.1				**η Eridani.** Mag. 4.0				**ϵ Arietis (*mean*).** Mag. 4.6			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 2 47		° ′ −21 21		h m 2 48		° ′ +52 24		h m 2 52		° ′ − 9 14		h m 2 54		° ′ +20 59	
	s		″		s		″		s		″		s		″	
Jan. 0.3	6.31		45.8		5.37		43.8		11.34		36.7		14.57		44.7	
10.3	6.20	11	46.9	11	5.20	17	44.8	10	11.25	9	37.6	9	14.49	8	44.6	1
20.3	6.07	13	47.8	9	4.99	21	45.3	5	11.14	11	38.4	8	14.38	11	44.4	2
30.3	5.92	15	48.4	6	4.75	24	45.4	1	11.01	13	39.0	6	14.25	13	44.0	4
Feb. 9.2	5.76	16	48.6	2	4.49	26	45.1	3	10.87	14	39.4	4	14.11	14	43.5	5
19.2	5.60	16	48.4	2	4.22	27	44.4	7	10.72	15	39.5	1	13.96	15	43.0	5
Mar. 1.2	5.44	16	47.9	5	3.97	25	43.3	11	10.58	14	39.4	1	13.81	15	42.4	6
11.1	5.29	15	47.1	8	3.74	23	41.9	14	10.45	13	39.0	4	13.67	14	41.8	6
21.1	5.17	12	46.0	11	3.55	19	40.2	17	10.34	11	38.4	6	13.56	11	41.2	6
31.1	5.08	9	44.5	15	3.42	13	38.4	18	10.26	8	37.5	9	13.48	8	40.6	6
Apr. 10.1	5.03	5	42.7	18	3.35	7	36.5	19	10.21	5	36.4	11	13.44	4	40.1	5
20.0	5.02	1	40.7	20	3.34	1	34.5	20	10.20	1	35.1	13	13.44	0	39.8	3
30.0	5.05	3	38.5	22	3.40	6	32.6	19	10.24	4	33.5	16	13.49	5	39.6	2
May 10.0	5.13	8	36.1	24	3.54	14	30.9	17	10.32	8	31.7	18	13.59	10	39.6	0
20.0	5.25	12	33.5	26	3.75	21	29.4	15	10.45	13	29.7	20	13.74	15	39.8	2
29.9	5.42	17	30.9	26	4.03	28	28.2	12	10.62	17	27.6	21	13.94	20	40.3	5
June 8.9	5.63	21	28.2	27	4.37	34	27.3	9	10.83	21	25.4	22	14.17	23	41.0	7
18.9	5.88	25	25.5	27	4.75	38	26.8	5	11.07	24	23.2	22	14.44	27	41.9	9
28.8	6.16	28	23.0	25	5.17	42	26.7	1	11.34	27	21.0	22	14.74	30	43.0	11
July 8.8	6.46	30	20.6	24	5.62	45	26.9	2	11.64	30	18.8	22	15.06	32	44.3	13
18.8	6.77	31	18.4	22	6.09	47	27.4	5	11.95	31	16.8	20	15.39	33	45.7	14
28.8	7.09	32	16.6	18	6.57	48	28.3	9	12.26	31	15.0	18	15.72	33	47.2	15
Aug. 7.7	7.42	33	15.1	15	7.05	48	29.6	13	12.57	31	13.4	16	16.06	34	48.7	15
17.7	7.73	31	13.9	12	7.51	46	31.2	16	12.88	31	12.1	13	16.39	33	50.2	15
27.7	8.03	30	13.2	7	7.96	45	33.0	18	13.17	29	11.1	10	16.70	31	51.7	15
Sept. 6.7	8.31	28	12.9	3	8.38	42	35.0	20	13.44	27	10.5	6	17.00	30	53.1	14
16.6	8.57	26	13.1	2	8.77	39	37.2	22	13.69	25	10.2	3	17.28	28	54.5	14
26.6	8.80	23	13.7	6	9.12	35	39.6	24	13.92	23	10.2	0	17.53	25	55.7	12
Oct. 6.6	9.00	20	14.6	9	9.43	31	42.0	24	14.12	20	10.6	4	17.75	22	56.8	11
16.5	9.16	16	15.9	13	9.70	27	44.5	25	14.30	18	11.3	7	17.94	19	57.8	10
26.5	9.29	13	17.5	16	9.93	23	47.0	25	14.44	14	12.2	9	18.11	17	58.6	8
Nov. 5.5	9.39	10	19.3	18	10.10	17	49.5	25	14.55	11	13.4	12	18.24	13	59.3	7
15.5	9.46	7	21.2	19	10.22	12	51.9	24	14.63	8	14.7	13	18.34	10	59.9	6
25.4	9.49	3	23.1	19	10.29	7	54.2	23	14.68	5	16.0	13	18.41	7	60.3	4
Dec. 5.4	9.49	0	25.0	19	10.31	2	56.2	20	14.69	1	17.4	14	18.45	4	60.6	3
15.4	9.45	4	26.8	18	10.27	4	58.0	18	14.68	1	18.7	13	18.45	0	60.8	2
25.4	9.39	6	28.4	16	10.18	9	59.5	15	14.64	4	19.9	12	18.42	3	60.8	0
35.3	9.30	9	29.7	13	10.03	15	60.7	12	14.57	7	21.0	11	18.36	6	60.7	1
Sec δ, Tan δ	1.074		−0.391		1.639		+1.299		1.013		−0.163		1.071		+0.384	
Mean Place	5ˢ.453		43″.32		4ˢ.865		25″.92		10ˢ.608		37″.82		14ˢ.034		34″.63	
$D'_\psi\,a$, $D_\omega\,a$	−0.01		+0.02		+0.02		−0.06		0.00		+0.01		+0.01		−0.02	
$D_\psi\,\delta$, $D_\omega\,\delta$	+0.3		+0.7		+0.3		+0.7		+0.3		+0.7		+0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**47 H. Cephei.** Mag. 5.7				**θ Eridani.** Mag. 3.4				**α Ceti.** Mag. 2.8				**γ Persei.** Mag. 3.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 2 54		° ′ +79 4		h m 2 54		° ′ −40 38		h m 2 57		° ′ + 3 44		h m 2 58		° ′ +53 9	
	s		″		s		″		s		″		s		″	
Jan. 0.3	29.86	77	56.1	19	59.15	18	77.0	14	44.44	8	61.5	7	29.84	16	77.6	11
10.3	29.09	89	58.0	13	58.97	19	78.4	10	44.36	10	60.8	6	29.68	21	78.7	7
20.3	28.20	98	59.3	8	58.78	21	79.4	5	44.26	12	60.2	5	29.47	25	79.4	2
30.3	27.22	103	60.1	1	58.57	23	79.9	0	44.14	14	59.7	4	29.22	27	79.6	2
Feb. 9.2	26.19	103	60.2	5	58.34	23	79.9	5	44.00	14	59.3	4	28.95	27	79.4	6
19.2	25.16	97	59.7	10	58.11	22	79.4	9	43.86	14	58.9	2	28.68	26	78.8	10
Mar. 1.2	24.19	89	58.7	16	57.89	20	78.5	14	43.72	13	58.7	1	28.42	24	77.8	13
11.2	23.30	76	57.1	20	57.69	18	77.1	18	43.59	11	58.6	1	28.18	21	76.5	16
21.1	22.54	59	55.1	24	57.51	15	75.3	22	43.48	8	58.7	3	27.97	15	74.9	18
31.1	21.95	40	52.7	26	57.36	10	73.1	25	43.40	4	59.0	4	27.82	9	73.1	19
Apr. 10.1	21.55	19	50.1	28	57.26	5	70.6	28	43.36	0	59.4	6	27.73	2	71.2	19
20.0	21.36	4	47.3	28	57.21	0	67.8	30	43.36	4	60.0	8	27.71	5	69.3	19
30.0	21.40	24	44.5	28	57.21	5	64.8	32	43.40	8	60.8	11	27.76	13	67.4	18
May 10.0	21.64	46	41.7	26	57.26	11	61.6	33	43.48	13	61.9	13	27.89	20	65.6	16
20.0	22.10	66	39.1	23	57.37	16	58.3	33	43.61	18	63.2	14	28.09	26	64.0	13
29.9	22.76	84	36.8	20	57.53	21	55.0	33	43.79	21	64.6	15	28.35	33	62.7	10
June 8.9	23.60	100	34.8	16	57.74	25	51.7	31	44.00	25	66.1	17	28.68	38	61.7	7
18.9	24.60	111	33.2	12	57.99	29	48.6	29	44.25	27	67.8	18	29.06	42	61.0	3
28.9	25.71	123	32.0	7	58.28	33	45.7	27	44.52	29	69.6	18	29.48	45	60.7	1
July 8.8	26.94	129	31.3	2	58.61	35	43.0	23	44.81	31	71.4	18	29.93	47	60.8	4
18.8	28.23	133	31.1	2	58.96	36	40.7	18	45.12	32	73.2	17	30.40	49	61.2	8
28.8	29.56	135	31.3	7	59.32	36	38.9	14	45.44	31	74.9	16	30.89	49	62.0	11
Aug. 7.7	30.91	133	32.0	12	59.68	36	37.5	9	45.75	31	76.5	14	31.38	48	63.1	14
17.7	32.24	129	33.2	16	60.04	35	36.6	3	46.06	29	77.9	12	31.86	46	64.5	17
27.7	33.53	123	34.8	21	60.39	32	36.3	2	46.35	28	79.1	10	32.32	43	66.2	19
Sept. 6.7	34.76	114	36.9	24	60.71	30	36.5	8	46.63	26	80.1	8	32.75	41	68.1	21
16.6	35.90	103	39.3	28	61.01	26	37.3	13	46.89	23	80.9	5	33.16	37	70.2	23
26.6	36.93	91	42.1	30	61.27	23	38.6	17	47.12	21	81.4	2	33.53	33	72.5	24
Oct. 6.6	37.84	77	45.1	32	61.50	19	40.3	21	47.33	19	81.6	0	33.86	29	74.9	24
16.6	38.61	61	48.3	34	61.69	14	42.4	24	47.52	15	81.6	2	34.15	24	77.3	25
26.5	39.22	44	51.7	35	61.83	10	44.8	26	47.67	12	81.4	4	34.39	20	79.8	25
Nov. 5.5	39.66	26	55.2	35	61.93	5	47.4	27	47.79	10	81.0	5	34.59	14	82.3	24
15.5	39.92	6	58.7	34	61.98	1	50.1	27	47.89	6	80.5	6	34.73	9	84.7	23
25.4	39.98	13	62.1	32	61.99	3	52.8	26	47.95	3	79.9	7	34.82	3	87.0	21
Dec. 5.4	39.85	33	65.3	29	61.96	8	55.4	24	47.98	0	79.2	8	34.85	3	89.1	19
15.4	39.52	50	68.2	26	61.88	12	57.8	21	47.98	3	78.4	7	34.82	8	91.0	16
25.4	39.02	68	70.8	22	61.76	15	59.9	17	47.95	6	77.7	7	34.74	13	92.6	13
35.3	38.34		73.0		61.61		61.6		47.89		77.0		34.61		93.9	
Sec δ, Tan δ	5.279		+5.184		1.319		−0.859		1.002		+0.066		1.668		+1.335	
Mean Place	$28^{\mathrm{s}}.216$		34″.50		$57^{\mathrm{s}}.857$		70″.35		$43^{\mathrm{s}}.790$		56″.38		$29^{\mathrm{s}}.224$		59″.72	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	+0.09		−0.25		−0.02		+0.04		0.00		0.00		+0.02		−0.06	
$D_\psi\,\delta$, $D_\omega\,\delta$	+0.3		+0.7		+0.3		+0.7		+0.3		+0.7		+0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**τ^3 Eridani.** Mag. 4.2				**ρ Persei.** Var. 3.4–4.2				**μ Horologii.** Mag. 5.2				**θ Hydri.** Mag. 5.5			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	2 58		−23 57		2 59		+38 30		3 1		−60 3		3 2		−72 13	
	s		″		s		″		s		″		s		″	
Jan. 0.3	34.31		56.2		36.34		28.3		35.80		98.4		7.80		102.5	
10.3	34.20	11	57.5	13	36.23	11	28.8	5	35.47	33	99.9	15	7.18	62	103.8	13
20.3	34.07	13	58.5	10	36.09	14	29.1	3	35.10	37	100.8	9	6.51	67	104.6	8
30.3	33.92	15	59.1	6	35.92	17	29.1	0	34.71	39	101.2	4	5.80	71	104.8	2
Feb. 9.2	33.75	17	59.3	2	35.73	19	28.8	3	34.31	40	101.0	2	5.07	73	104.4	4
19.2	33.57	18	59.2	1	35.54	19	28.2	6	33.91	40	100.2	8	4.35	72	103.4	10
Mar. 1.2	33.40	17	58.7	5	35.35	19	27.3	9	33.52	39	98.9	13	3.66	69	101.8	16
11.2	33.25	15	57.9	8	35.18	17	26.3	10	33.16	36	97.1	18	3.02	64	99.8	20
21.1	33.12	13	56.7	12	35.04	14	25.1	12	32.84	32	94.8	23	2.44	58	97.3	25
31.1	33.01	11	55.2	15	34.93	11	23.8	13	32.56	28	92.1	27	1.94	50	94.4	29
Apr. 10.1	32.94	7	53.4	18	34.87	6	22.5	13	32.34	22	89.1	30	1.53	41	91.2	32
20.0	32.91	3	51.3	21	34.86	1	21.2	13	32.19	15	85.8	33	1.23	30	87.8	34
30.0	32.93	2	49.0	23	34.91	5	20.0	12	32.12	7	82.3	35	1.04	19	84.2	36
May 10.0	32.99	6	46.5	25	35.02	11	19.0	10	32.12	0	78.7	36	0.98	6	80.5	37
20.0	33.10	11	43.8	27	35.19	17	18.2	8	32.20	8	75.0	37	1.04	6	76.7	38
29.9	33.26	16	41.0	28	35.41	22	17.7	5	32.36	16	71.3	37	1.22	18	73.0	37
June 8.9	33.46	20	38.2	28	35.67	26	17.4	3	32.59	23	67.8	35	1.51	29	69.5	35
18.9	33.70	24	35.5	27	35.98	31	17.4	0	32.89	30	64.5	33	1.91	40	66.2	33
28.9	33.97	27	32.9	26	36.32	34	17.7	3	33.25	36	61.4	31	2.42	51	63.2	30
July 8.8	34.27	30	30.4	25	36.69	37	18.3	6	33.66	41	58.7	27	3.01	59	60.6	26
18.8	34.58	31	28.2	22	37.07	38	19.1	8	34.11	45	56.4	23	3.67	66	58.5	21
28.8	34.90	32	26.3	19	37.46	39	20.2	11	34.59	48	54.7	17	4.38	71	56.9	16
Aug. 7.7	35.22	32	24.7	16	37.85	39	21.5	13	35.08	49	53.5	12	5.12	74	55.9	10
17.7	35.54	32	23.6	11	38.23	38	23.0	15	35.57	49	52.9	6	5.86	74	55.5	4
27.7	35.85	31	22.9	7	38.60	37	24.6	16	36.05	48	52.9	0	6.59	73	55.7	2
Sept. 6.7	36.14	29	22.7	2	38.95	35	26.3	17	36.50	45	53.5	6	7.28	69	56.5	8
16.6	36.40	26	22.9	2	39.27	32	28.1	18	36.92	42	54.7	12	7.91	63	57.9	14
26.6	36.64	24	23.5	6	39.57	30	29.9	18	37.29	37	56.5	18	8.47	56	59.9	20
Oct. 6.6	36.85	21	24.6	11	39.84	27	31.8	19	37.60	31	58.7	22	8.93	46	62.3	24
16.6	37.03	18	26.0	14	40.08	24	33.6	18	37.85	25	61.4	27	9.28	35	65.1	28
26.5	37.18	15	27.7	17	40.28	20	35.4	18	38.02	17	64.4	30	9.51	23	68.2	31
Nov. 5.5	37.29	11	29.6	19	40.44	16	37.1	17	38.12	10	67.5	31	9.61	10	71.5	33
15.5	37.36	7	31.6	20	40.56	12	38.7	16	38.15	3	70.7	32	9.58	3	74.8	33
25.4	37.40	4	33.7	21	40.65	9	40.2	15	38.10	5	73.8	31	9.42	16	78.0	32
Dec. 5.4	37.40	0	35.8	21	40.69	4	41.5	13	37.98	12	76.7	29	9.14	28	81.0	30
15.4	37.37	3	37.8	20	40.69	0	42.6	11	37.79	19	79.4	27	8.75	39	83.6	26
25.4	37.31	6	39.5	17	40.65	4	43.5	9	37.54	25	81.7	23	8.25	50	85.8	22
35.3	37.22	9	41.0	15	40.57	8	44.2	7	37.24	30	83.5	18	7.67	58	87.5	17
Sec δ, Tan δ	1.094		−0.444		1.278		+0.796		2.005		−1.737		3.278		−3.122	
Mean Place	$33^s.365$		$53''.61$		$35^s.776$		$13''.64$		$33^s.547$		$88''.96$		$3^s.924$		$91''.93$	
$D'_\psi a$, $D_\omega a$	−0.01		+0.02		+0.01		−0.04		−0.03		+0.08		−0.06		+0.15	
$D_\psi \delta$, $D_\omega \delta$	+0.3		+0.7		+0.3		+0.7		+0.3		+0.7		+0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**β Persei.** Var. 2.1–3.2				**δ Arietis.** Mag. 4.5				**12 Eridani.** Mag. 4.0				**48 H. Cephei.** Mag. 5.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 3 2		° ′ +40 37		h m 3 6		° ′ +19 23		h m 3 8		° ′ −29 19		h m 3 9		° ′ +77 24	
	s		″		s		″		s		″		s		″	
Jan. 0.4	30.73	11	31.6	6	39.70	7	63.9	1	23.56	12	50.0	14	16.22	61	80.5	20
10.3	30.62	15	32.2	4	39.63	10	63.8	2	23.44	15	51.4	10	15.61	73	82.5	14
20.3	30.47	17	32.6	0	39.53	13	63.6	4	23.29	17	52.4	7	14.88	82	83.9	9
30.3	30.30	19	32.6	3	39.40	15	63.2	4	23.12	18	53.1	3	14.06	87	84.8	3
Feb. 9.2	30.11	20	32.3	6	39.25	15	62.8	5	22.94	19	53.4	2	13.19	89	85.1	3
19.2	29.91	20	31.7	8	39.10	15	62.3	5	22.75	19	53.2	6	12.30	86	84.8	8
Mar. 1.2	29.71	18	30.9	11	38.95	14	61.8	5	22.56	17	52.6	9	11.44	79	84.0	14
11.2	29.53	15	29.8	13	38.81	12	61.3	5	22.39	15	51.7	13	10.65	69	82.6	19
21.1	29.38	12	28.5	13	38.69	9	60.8	5	22.24	12	50.4	17	9.96	55	80.7	23
31.1	29.26	7	27.2	14	38.60	5	60.3	4	22.12	9	48.7	20	9.41	39	78.4	25
Apr. 10.1	29.19	1	25.8	13	38.55	1	59.9	2	22.03	5	46.7	23	9.02	22	75.9	27
20.1	29.18	5	24.5	13	38.54	4	59.7	1	21.98	0	44.4	26	8.80	2	73.2	27
30.0	29.23	11	23.2	12	38.58	9	59.6	1	21.98	5	41.8	27	8.78	17	70.5	27
May 10.0	29.34	16	22.0	9	38.67	14	59.7	3	22.03	10	39.1	29	8.95	36	67.8	26
20.0	29.50	22	21.1	7	38.81	18	60.0	5	22.13	15	36.2	30	9.31	54	65.2	24
29.9	29.72	27	20.4	4	38.99	22	60.5	7	22.28	19	33.2	30	9.85	70	62.8	21
June 8.9	29.99	31	20.0	1	39.21	26	61.2	9	22.47	23	30.2	29	10.55	84	60.7	17
18.9	30.30	35	19.9	2	39.47	29	62.1	11	22.70	27	27.3	28	11.39	96	59.0	13
28.9	30.65	38	20.1	5	39.76	31	63.2	12	22.97	29	24.5	26	12.35	105	57.7	9
July 8.8	31.03	39	20.6	8	40.07	33	64.4	14	23.26	32	21.9	23	13.40	113	56.8	4
18.8	31.42	40	21.4	10	40.40	33	65.8	14	23.58	33	19.6	20	14.53	117	56.4	0
28.8	31.82	40	22.4	12	40.73	33	67.2	15	23.91	33	17.6	16	15.70	119	56.4	5
Aug. 7.8	32.22	39	23.6	14	41.06	33	68.7	14	24.24	33	16.0	11	16.89	119	56.9	10
17.7	32.61	38	25.0	16	41.39	31	70.1	14	24.57	31	14.9	6	18.08	116	57.9	15
27.7	32.99	36	26.6	18	41.70	30	71.5	13	24.88	30	14.3	2	19.24	111	59.4	18
Sept. 6.7	33.35	33	28.4	18	42.00	28	72.8	13	25.18	28	14.1	3	20.35	105	61.2	22
16.6	33.68	31	30.2	19	42.28	26	74.1	11	25.46	26	14.4	8	21.40	96	63.4	26
26.6	33.99	28	32.1	19	42.54	23	75.2	10	25.72	22	15.2	12	22.36	86	66.0	28
Oct. 6.6	34.27	24	34.0	19	42.77	21	76.2	8	25.94	19	16.4	16	23.22	74	68.8	31
16.6	34.51	21	35.9	19	42.98	18	77.0	7	26.13	16	18.0	19	23.96	61	71.9	33
26.5	34.72	17	37.8	18	43.16	14	77.7	5	26.29	12	19.9	22	24.57	47	75.2	33
Nov. 5.5	34.89	13	39.6	17	43.30	12	78.2	4	26.41	8	22.1	23	25.04	31	78.5	34
15.5	35.02	9	41.3	16	43.42	8	78.6	3	26.49	4	24.4	24	25.35	14	81.9	33
25.5	35.11	5	42.9	14	43.50	5	78.9	2	26.53	1	26.8	23	25.49	3	85.2	32
Dec. 5.4	35.16	0	44.3	13	43.55	1	79.1	1	26.54	3	29.1	21	25.46	21	88.4	30
15.4	35.16	5	45.6	10	43.56	2	79.2	0	26.51	7	31.2	19	25.25	37	91.4	27
25.4	35.11	9	46.6	8	43.54	5	79.2	1	26.44	10	33.1	17	24.88	52	94.1	22
35.3	35.02		47.4		43.49		79.1		26.34		34.8		24.36		96.3	
Sec δ, Tan δ	1.317		+0.858		1.060		+0.352		1.147		−0.562		4.592		+4.482	
Mean Place	30ˢ.150		16″.39		39ˢ.084		54″.19		22ˢ.468		46″.56		14ˢ.359		59″.34	
D′ψ a, Dω a	+0.02		−0.04		+0.01		−0.02		−0.01		+0.03		+0.09		−0.20	
Dψ δ, Dω δ	+0.3		+0.7		+0.3		+0.7		+0.3		+0.7		+0.3		+0.7	

Mean Solar Date.	ζ Arietis. Mag. 5.0				38 Horologii (G.). Mag. 5.7				ζ Eridani. Mag. 4.9				τ Arietis. Mag. 5.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 3 9 s		° ′ +20 43 ″		h m 3 10 s		° ′ −57 38 ″		h m 3 11 s		° ′ − 9 8 ″		h m 3 16 s		° ′ +20 50 ″	
Jan. 0.4	54.49		31.5		22.86		58.1		37.20		30.2		12.76		12.8	
10.3	54.42	7	31.5	0	22.57	29	59.7	16	37.12	8	31.2	10	12.69	7	12.7	1
20.3	54.32	10	31.3	2	22.24	33	60.8	11	37.01	11	32.1	9	12.59	10	12.6	1
30.3	54.19	13	31.0	3	21.89	35	61.3	5	36.88	13	32.8	7	12.46	13	12.3	3
Feb. 9.2	54.04	15	30.6	4	21.52	37	61.3	0	36.74	14	33.2	4	12.32	14	11.9	4
19.2	53.88	16	30.1	5	21.15	37	60.7	6	36.59	15	33.4	2	12.17	15	11.5	4
Mar. 1.2	53.73	15	29.6	5	20.78	37	59.5	12	36.44	15	33.3	1	12.01	16	11.0	5
11.2	53.59	14	29.0	6	20.43	35	57.8	17	36.30	14	33.0	3	11.86	15	10.5	5
21.1	53.47	12	28.5	5	20.12	31	55.7	21	36.17	13	32.4	6	11.73	13	9.9	6
31.1	53.38	9	28.0	5	19.86	26	53.2	25	36.07	10	31.6	8	11.64	9	9.4	5
Apr. 10.1	53.32	6	27.5	5	19.65	21	50.3	29	36.01	6	30.5	11	11.58	6	8.9	5
20.1	53.30	2	27.2	3	19.50	15	47.1	32	35.99	2	29.2	13	11.56	2	8.6	3
30.0	53.34	4	27.0	2	19.42	8	43.7	34	36.01	2	27.7	15	11.59	3	8.4	2
May 10.0	53.43	9	27.0	0	19.41	1	40.1	36	36.07	6	26.0	17	11.67	8	8.4	0
20.0	53.56	13	27.2	2	19.48	7	36.5	36	36.18	11	24.1	19	11.79	12	8.6	2
29.9	53.74	18	27.6	4	19.62	14	32.9	36	36.33	15	22.0	21	11.97	18	9.0	4
June 8.9	53.96	22	28.2	6	19.83	21	29.3	36	36.52	19	19.8	22	12.19	22	9.6	6
18.9	54.22	26	29.1	9	20.11	28	25.9	34	36.75	23	17.6	22	12.44	25	10.4	8
28.9	54.51	29	30.1	10	20.45	34	22.8	31	37.01	26	15.4	22	12.72	28	11.4	10
July 8.8	54.82	31	31.2	11	20.83	38	20.1	27	37.29	28	13.2	22	13.03	31	12.5	11
18.8	55.15	33	32.5	13	21.25	42	17.8	23	37.59	30	11.2	20	13.36	33	13.7	12
28.8	55.48	33	33.9	14	21.70	45	15.9	19	37.90	31	9.4	18	13.69	33	15.0	13
Aug. 7.8	55.82	34	35.3	14	22.16	46	14.5	14	38.21	31	7.8	16	14.03	34	16.4	14
17.7	56.15	33	36.8	15	22.62	46	13.8	7	38.52	31	6.4	14	14.36	33	17.8	14
27.7	56.47	32	38.2	14	23.08	46	13.7	1	38.82	30	5.4	10	14.68	32	19.2	14
Sept. 6.7	56.77	30	39.5	13	23.51	43	14.2	5	39.10	28	4.7	7	14.99	31	20.5	13
16.6	57.05	28	40.7	12	23.91	40	15.3	11	39.36	26	4.4	3	15.28	29	21.7	12
26.6	57.31	26	41.9	12	24.27	36	16.9	16	39.60	24	4.5	1	15.54	26	22.8	11
Oct. 6.6	57.55	24	42.9	10	24.58	31	19.0	21	39.82	22	4.9	4	15.78	24	23.8	10
16.6	57.76	21	43.8	9	24.83	25	21.5	25	40.01	19	5.5	6	16.00	22	24.7	9
26.5	57.94	18	44.5	7	25.01	18	24.4	29	40.17	16	6.5	10	16.19	19	25.4	7
Nov. 5.5	58.09	15	45.1	6	25.13	12	27.5	31	40.30	13	7.7	12	16.35	16	26.0	6
15.5	58.21	12	45.6	5	25.18	5	30.7	32	40.40	10	9.0	13	16.47	12	26.4	4
25.5	58.30	9	46.0	4	25.15	3	33.8	31	40.47	7	10.4	14	16.56	9	26.8	4
Dec. 5.4	58.35	5	46.2	2	25.06	9	36.8	30	40.50	3	11.8	14	16.62	6	27.1	3
15.4	58.37	2	46.4	2	24.91	15	39.5	27	40.50	0	13.2	14	16.65	3	27.2	1
25.4	58.35	2	46.5	1	24.70	21	41.9	24	40.47	3	14.5	13	16.64	1	27.3	1
35.3	58.30	5	46.4	1	24.43	27	43.9	20	40.41	6	15.7	12	16.59	5	27.3	0
Sec δ, Tan δ	1.069		+0.378		1.869		−1.578		1.013		−0.161		1.070		+0.381	
Mean Place	53ˢ.856		21″.42		20ˢ.734		49″.64		36ˢ.379		32″.07		12ˢ.091		2″.60	
D′ψ a, Dω a	+0.01		−0.02		−0.03		+0.07		0.00		+0.01		+0.01		−0.02	
Dψ δ, Dω δ	+0.3		+0.7		+0.3		+0.7		+0.3		+0.7		+0.3		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	e Eridani. Mag. 4.3				ι Hydri. Mag. 5.5				α Persei. Mag. 1.9				ο Tauri. Mag. 3.8			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 3 16		° ′ −43 23		h m 3 18		° ′ −77 41		h m 3 18		° ′ +49 33		h m 3 20		° ′ + 8 43	
	s		″		s		″		s		″		s		″	
Jan. 0.4	28.64		72.9		12.13		93.4		7.03		25.5		8.49		31.1	
10.3	28.47	17	74.6	17	11.21	92	94.9	15	6.90	13	26.6	11	8.43	6	30.6	5
20.3	28.28	19	75.8	12	10.21	100	95.9	10	6.73	17	27.3	7	8.34	9	30.1	5
30.3	28.06	22	76.5	7	9.14	107	96.2	3	6.52	21	27.6	3	8.22	12	29.6	5
Feb. 9.3	27.82	24	76.7	2	8.05	109	95.9	3	6.28	24	27.6	0	8.08	14	29.2	4
19.2	27.58	24	76.4	3	6.96	109	95.1	8	6.03	25	27.2	4	7.93	15	28.9	3
Mar. 1.2	27.34	24	75.6	8	5.90	106	93.7	14	5.79	24	26.4	8	7.78	15	28.6	3
11.2	27.11	23	74.3	13	4.90	100	91.8	19	5.56	23	25.3	11	7.64	14	28.3	3
21.1	26.90	21	72.6	17	3.98	92	89.5	23	5.36	20	24.0	13	7.52	12	28.2	1
31.1	26.73	17	70.5	21	3.17	81	86.7	28	5.20	16	22.4	16	7.42	10	28.2	0
Apr. 10.1	26.60	13	68.0	25	2.49	68	83.6	31	5.09	11	20.7	17	7.36	6	28.4	2
20.1	26.52	8	65.2	28	1.95	54	80.3	33	5.05	4	19.0	17	7.34	2	28.7	3
30.0	26.49	3	62.1	31	1.57	38	76.8	35	5.08	3	17.3	17	7.36	2	29.2	5
May 10.0	26.52	3	58.9	32	1.35	22	73.1	37	5.17	9	15.7	16	7.43	7	29.9	7
20.0	26.60	8	55.6	33	1.31	4	69.4	37	5.33	16	14.2	15	7.54	11	30.8	9
30.0	26.74	14	52.2	34	1.44	13	65.7	37	5.56	23	12.9	13	7.70	16	31.9	11
June 8.9	26.94	20	48.8	34	1.74	30	62.2	35	5.84	28	12.0	9	7.90	20	33.1	12
18.9	27.18	24	45.5	33	2.20	46	58.9	33	6.18	34	11.3	7	8.13	23	34.5	14
28.9	27.46	28	42.5	30	2.81	61	55.9	30	6.56	38	10.9	4	8.40	27	36.0	15
July 8.8	27.78	32	39.7	28	3.55	74	53.2	27	6.97	41	10.9	0	8.69	29	37.5	15
18.8	28.13	35	37.2	25	4.40	85	51.0	22	7.41	44	11.3	4	8.99	30	39.1	16
28.8	28.50	37	35.2	20	5.34	94	49.4	16	7.86	45	11.9	6	9.30	31	40.7	16
Aug. 7.8	28.88	38	33.7	15	6.33	99	48.3	11	8.32	46	12.8	9	9.62	32	42.2	15
17.7	29.26	38	32.7	10	7.35	102	47.7	6	8.77	45	14.0	12	9.94	32	43.6	14
27.7	29.63	37	32.2	5	8.37	102	47.8	1	9.21	44	15.4	14	10.24	30	44.8	12
Sept. 6.7	29.98	35	32.3	1	9.36	99	48.5	7	9.64	43	17.1	17	10.53	29	45.8	10
16.7	30.31	33	32.9	6	10.27	91	49.8	13	10.04	40	18.9	18	10.80	27	46.7	9
26.6	30.61	30	34.1	12	11.08	81	51.7	19	10.41	37	20.9	20	11.06	26	47.4	7
Oct. 6.6	30.88	27	35.8	17	11.76	68	54.1	24	10.74	33	23.0	21	11.29	23	47.8	4
16.6	31.10	22	37.9	21	12.29	53	56.8	27	11.04	30	25.2	22	11.49	20	48.0	2
26.5	31.28	18	40.4	25	12.65	36	59.8	30	11.30	26	27.4	22	11.67	18	48.0	0
Nov. 5.5	31.41	13	43.1	27	12.82	17	63.1	33	11.52	22	29.6	22	11.82	15	47.9	1
15.5	31.49	8	45.9	28	12.80	2	66.4	33	11.69	17	31.7	21	11.94	12	47.6	3
25.5	31.53	4	48.8	29	12.59	21	69.7	33	11.81	12	33.8	21	12.03	9	47.2	4
Dec. 5.4	31.52	1	51.6	28	12.19	40	72.7	30	11.87	6	35.8	20	12.09	6	46.7	5
15.4	31.46	6	54.1	25	11.62	57	75.4	27	11.88	1	37.5	17	12.11	2	46.2	5
25.4	31.36	10	56.4	23	10.90	72	77.7	23	11.84	4	39.0	15	12.10	1	45.7	5
35.4	31.22	14	58.4	20	10.05	85	79.6	19	11.74	10	40.3	13	12.06	4	45.1	6
Sec δ, Tan δ	1.376		−0.945		4.695		−4.587		1.541		+1.173		1.012		+0.153	
Mean Place	27ˢ.164		67″.10		6ˢ.249		83″.89		6ˢ.259		8″.55		7ˢ.762		24″.15	
D′ψ α, Dω α	−0.02		+0.04		−0.09		+0.20		+0.02		−0.05		0.00		−0.01	
Dψ δ, Dω δ	+0.3		+0.8		+0.3		+0.8		+0.3		+0.8		+0.3		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**2 H. Camelop.** Mag. 4.4				**ξ Tauri.** Mag. 3.8				***f* Tauri.** Mag. 4.3				**ε Eridani.** Mag. 3.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	3 21		+59 38		3 22		+ 9 25		3 26		+12 38		3 28		− 9 44	
	s		″		s		″		s		″		s		″	
Jan. 0.4	61.88		35.8		27.87		54.9		4.81		29.4		50.74		65.1	
10.3	61.69	19	37.3	15	27.81	6	54.4	5	4.75	6	29.0	4	50.67	7	66.3	12
20.3	61.44	25	38.4	11	27.72	9	53.9	5	4.66	9	28.6	4	50.56	11	67.2	9
30.3	61.15	29	39.0	6	27.60	12	53.4	5	4.54	12	28.2	4	50.43	13	67.9	7
Feb. 9.3	60.83	32	39.2	2	27.46	14	53.0	4	4.40	14	27.8	4	50.29	14	68.4	5
19.2	60.49	34	38.9	3	27.32	14	52.6	4	4.25	15	27.4	4	50.13	16	68.6	2
Mar. 1.2	60.16	33	38.2	7	27.17	15	52.3	3	4.10	15	27.1	3	49.97	16	68.6	0
11.2	59.84	32	37.0	12	27.03	14	52.1	2	3.96	14	26.8	3	49.82	15	68.3	3
21.1	59.56	28	35.4	16	26.90	13	52.0	1	3.83	13	26.5	3	49.68	14	67.8	5
31.1	59.34	22	33.6	18	26.80	10	52.0	0	3.73	10	26.4	1	49.57	11	67.0	8
Apr. 10.1	59.19	15	31.6	20	26.74	6	52.1	1	3.66	7	26.4	0	49.49	8	66.0	10
20.1	59.11	8	29.5	21	26.71	3	52.4	3	3.63	3	26.5	1	49.45	4	64.7	13
30.0	59.12	1	27.4	21	26.73	2	52.9	5	3.65	2	26.7	2	49.45	0	63.2	15
May 10.0	59.22	10	25.3	21	26.80	7	53.5	6	3.72	7	27.1	4	49.49	4	61.5	17
20.0	59.40	18	23.3	20	26.91	11	54.3	8	3.83	11	27.8	7	49.58	9	59.6	19
30.0	59.66	26	21.6	17	27.07	16	55.3	10	3.98	15	28.7	9	49.72	14	57.5	21
June 8.9	60.00	34	20.1	15	27.27	20	56.5	12	4.18	20	29.7	10	49.90	18	55.4	21
18.9	60.40	40	18.9	12	27.50	23	57.9	14	4.42	24	30.8	11	50.11	21	53.2	22
28.9	60.86	46	18.1	8	27.76	26	59.3	14	4.68	26	32.1	13	50.35	24	51.0	22
July 8.8	61.36	50	17.7	4	28.05	29	60.8	15	4.97	29	33.5	14	50.62	27	48.8	22
18.8	61.89	53	17.6	1	28.36	31	62.4	16	5.28	31	35.0	15	50.91	29	46.8	20
28.8	62.45	56	17.9	3	28.67	31	63.9	15	5.60	32	36.4	14	51.21	30	44.9	19
Aug. 7.8	63.02	57	18.6	7	28.99	32	65.4	15	5.92	32	37.8	14	51.52	31	43.3	16
17.7	63.58	56	19.6	10	29.31	32	66.8	14	6.24	32	39.2	14	51.82	30	41.9	14
27.7	64.13	55	21.0	14	29.61	30	68.0	12	6.55	31	40.5	13	52.12	30	40.9	10
Sept. 6.7	64.66	53	22.7	17	29.90	29	69.0	10	6.85	30	41.6	11	52.41	29	40.2	7
16.7	65.16	50	24.6	19	30.18	28	69.9	9	7.13	28	42.5	9	52.68	27	39.9	3
26.6	65.62	46	26.8	22	30.44	26	70.6	7	7.39	26	43.2	7	52.93	25	40.0	1
Oct. 6.6	66.04	42	29.1	23	30.67	23	71.1	5	7.63	24	43.8	6	53.16	23	40.4	4
16.6	66.42	38	31.6	25	30.88	21	71.3	2	7.84	21	44.2	4	53.36	20	41.1	7
26.5	66.75	33	34.2	26	31.06	18	71.3	0	8.03	19	44.4	2	53.53	17	42.1	10
Nov. 5.5	67.02	27	36.8	26	31.21	15	71.2	1	8.19	16	44.5	1	53.68	15	43.3	12
15.5	67.22	20	39.5	27	31.34	13	71.0	2	8.32	13	44.5	0	53.79	11	44.7	14
25.5	67.36	14	42.1	26	31.43	9	70.6	4	8.42	10	44.3	2	53.87	8	46.2	15
Dec. 5.4	67.43	7	44.5	24	31.49	6	70.2	4	8.48	6	44.1	2	53.92	5	47.8	16
15.4	67.43	0	46.8	23	31.51	2	69.7	5	8.51	3	43.8	3	53.94	2	49.3	15
25.4	67.35	8	48.8	20	31.50	1	69.2	5	8.51	0	43.4	4	53.92	2	50.7	14
35.4	67.20	15	50.5	17	31.46	4	68.7	5	8.47	4	43.0	4	53.86	6	51.9	12
Sec δ, Tan δ	1.978		+1.707		1.014		+0.166		1.025		+0.224		1.015		−0.172	
Mean Place	60ˢ.890		17″.18		27ˢ.134		47″.63		4ˢ.068		21″.23		49ˢ.841		67″.42	
$D'_\psi \alpha$, $D_\omega \alpha$	+0.03		−0.07		0.00		−0 01		0.00		−0.01		0.00		+0.01	
$D_\psi \delta$, $D_\omega \delta$	+0.3		+0.8		+0.3		+0.8		+0.2		+0.8		+0.2		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**τ⁵ Eridani.** Mag. 4.3				**δ Persei.** Mag. 3.1				**δ Eridani.** Mag. 3.7				**ν Persei.** Mag. 3.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	3 29		−21 54		3 36		+47 30		3 39		−10 2		3 39		+42 18	
	s		″		s		″		s		″		s		″	
Jan. 0.4	57.66	9	87.6	15	44.37	10	53.1	11	5.75	7	84.1	12	17.58	8	31.9	9
10.3	57.57	12	89.1	12	44.27	15	54.2	8	5.68	10	85.3	10	17.50	13	32.8	6
20.3	57.45	15	90.3	8	44.12	19	55.0	5	5.58	13	86.3	7	17.37	17	33.4	4
30.3	57.30	16	91.1	5	43.93	22	55.5	1	5.45	14	87.0	5	17.20	19	33.8	1
Feb. 9.3	57.14	17	91.6	1	43.71	23	55.6	2	5.31	15	87.5	3	17.01	21	33.9	3
19.2	56.97	18	91.7	2	43.48	24	55.4	6	5.16	16	87.8	0	16.80	21	33.6	6
Mar. 1.2	56.79	17	91.5	6	43.24	23	54.8	9	5.00	16	87.8	3	16.59	21	33.0	8
11.2	56.62	16	90.9	9	43.01	20	53.9	12	4.84	14	87.5	5	16.38	18	32.2	10
21.2	56.46	13	90.0	12	42.81	17	52.7	14	4.70	12	87.0	8	16.20	15	31.2	12
31.1	56.33	9	88.8	16	42.64	12	51.3	15	4.58	9	86.2	10	16.05	11	30.0	13
Apr. 10.1	56.24	6	87.2	19	42.52	6	49.8	16	4.49	5	85.2	13	15.94	6	28.7	14
20.1	56.18	1	85.3	21	42.46	0	48.2	16	4.44	1	83.9	15	15.88	0	27.3	13
30.0	56.17	3	83.2	23	42.46	7	46.6	15	4.43	4	82.4	17	15.88	6	26.0	13
May 10.0	56.20	8	80.9	25	42.53	13	45.1	14	4.47	8	80.7	19	15.94	13	24.7	11
20.0	56.28	13	78.4	26	42.66	20	43.7	12	4.55	12	78.8	21	16.07	18	23.6	10
30.0	56.41	18	75.8	27	42.86	25	42.5	10	4.67	17	76.7	22	16.25	24	22.6	7
June 8.9	56.59	21	73.1	27	43.11	31	41.5	7	4.84	21	74.5	22	16.49	29	21.9	5
18.9	56.80	24	70.4	26	43.42	35	40.8	4	5.05	24	72.3	22	16.78	32	21.4	2
28.9	57.04	27	67.8	25	43.77	39	40.4	2	5.29	27	70.1	22	17.10	36	21.2	1
July 8.9	57.31	30	65.3	22	44.16	42	40.2	2	5.56	28	67.9	21	17.46	39	21.3	3
18.8	57.61	31	63.1	20	44.58	43	40.4	5	5.84	30	65.8	19	17.85	40	21.6	6
28.8	57.92	32	61.1	17	45.01	44	40.9	7	6.14	31	63.9	16	18.25	40	22.2	8
Aug. 7.8	58.24	31	59.4	13	45.45	44	41.6	10	6.45	31	62.3	14	18.65	41	23.0	10
17.7	58.55	31	58.1	9	45.89	43	42.6	12	6.76	30	60.9	10	19.06	40	24.0	12
27.7	58.86	30	57.2	4	46.32	42	43.8	14	7.06	29	59.9	7	19.46	39	25.2	14
Sept. 6.7	59.16	28	56.8	0	46.74	40	45.2	16	7.35	27	59.2	3	19.85	37	26.6	15
16.7	59.44	26	56.8	5	47.14	38	46.8	17	7.62	26	58.9	0	20.22	35	28.1	16
26.6	59.70	23	57.3	9	47.52	35	48.5	19	7.88	24	58.9	4	20.57	32	29.7	17
Oct. 6.6	59.93	21	58.2	13	47.87	31	50.4	19	8.12	21	59.3	7	20.89	30	31.4	17
16.6	60.14	18	59.5	16	48.18	28	52.3	20	8.33	18	60.0	10	21.19	26	33.1	17
26.6	60.32	14	61.1	19	48.46	24	54.3	20	8.51	16	61.0	13	21.45	22	34.8	17
Nov. 5.5	60.46	11	63.0	20	48.70	19	56.3	20	8.67	13	62.3	14	21.67	19	36.5	17
15.5	60.57	7	65.0	21	48.89	14	58.3	19	8.80	9	63.7	15	21.86	14	38.2	16
25.5	60.64	4	67.1	21	49.03	10	60.2	18	8.89	6	65.2	16	22.00	9	39.8	15
Dec. 5.4	60.68	0	69.2	20	49.13	4	62.0	17	8.95	2	66.8	15	22.09	5	41.3	14
15.4	60.68	4	71.2	19	49.17	2	63.7	15	8.97	1	68.3	14	22.14	0	42.7	12
25.4	60.64	7	73.1	17	49.15	7	65.2	13	8.96	4	69.7	13	22.14	6	43.9	11
35.4	60.57		74.8		49.08		66.5		8.92		71.0		22.08		45.0	
Sec δ, Tan δ	1.078		−0.402		1.480		+1.092		1.016		−0.177		1.352		+0.910	
Mean Place	56ˢ.609		87″.08		43ˢ.465		36″.93		4ˢ.802		86″.71		16ˢ.710		16″.78	
D′ψ α, Dω α	−0.01		+0.02		+0.02		−0.04		0.00		+0.01		+0.02		−0.04	
Dψ δ, Dω δ	+0.2		+0.8		+0.2		+0.8		+0.2		+0.8		+0.2		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**5 H. Camelop.** Mag. 4.7				**η Tauri.** Mag. 3.0				**τ^6 Eridani.** Mag. 4.3				**g Eridani.** Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 3 41		° ′ +71 3		h m 3 42		° ′ +23 50		h m 3 43		° ′ −23 29		h m 3 46		° ′ −36 27	
	s		″		s		″		s		″		s		″	
Jan. 0.4	11.18		74.7		19.40		23.6		7.40		80.1		13.34		49.6	
10.3	10.87	31	76.8	21	19.35	5	23.7	1	7.31	9	81.7	16	13.22	12	51.5	19
20.3	10.47	40	78.4	16	19.26	9	23.7	0	7.19	12	83.0	13	13.06	16	53.0	15
30.3	9.99	48	79.5	11	19.14	12	23.6	1	7.04	15	84.0	10	12.87	19	54.1	11
Feb. 9.3	9.45	54	80.1	6	18.99	15	23.4	2	6.88	16	84.6	6	12.66	21	54.7	6
19.2	8.88	57	80.2	1	18.83	16	23.1	3	6.70	18	84.8	2	12.44	22	54.8	1
Mar. 1.2	8.31	57	79.7	5	18.67	16	22.7	4	6.51	19	84.7	1	12.21	23	54.5	3
11.2	7.77	54	78.7	10	18.51	16	22.2	5	6.33	18	84.2	5	11.99	22	53.7	8
21.2	7.28	49	77.2	15	18.36	15	21.6	6	6.17	16	83.3	9	11.78	21	52.5	12
31.1	6.86	42	75.4	18	18.24	12	21.0	6	6.03	14	82.1	12	11.60	18	50.9	16
Apr. 10.1	6.54	32	73.2	22	18.16	8	20.5	5	5.92	11	80.5	16	11.46	14	48.9	20
20.1	6.34	20	70.8	24	18.12	4	20.0	5	5.84	8	78.7	18	11.36	10	46.5	24
30.0	6.27	7	68.3	25	18.12	0	19.7	3	5.81	3	76.6	21	11.30	6	43.9	26
May 10.0	6.33	6	65.7	26	18.17	5	19.5	2	5.83	2	74.2	24	11.29	1	41.0	29
20.0	6.51	18	63.2	25	18.28	11	19.4	1	5.90	7	71.7	25	11.34	5	38.0	30
30.0	6.82	31	60.9	23	18.43	15	19.5	1	6.01	11	69.1	26	11.44	10	34.9	31
June 8.9	7.25	43	58.8	21	18.63	20	19.8	3	6.17	16	66.4	27	11.59	15	31.7	32
18.9	7.78	53	57.0	18	18.87	24	20.3	5	6.37	20	63.7	27	11.78	19	28.5	32
28.9	8.41	63	55.6	14	19.14	27	21.0	7	6.60	23	61.0	27	12.02	24	25.5	30
July 8.9	9.11	70	54.5	11	19.44	30	21.8	8	6.87	27	58.5	25	12.30	28	22.7	28
18.8	9.87	76	53.8	7	19.76	32	22.8	10	7.16	29	56.2	23	12.60	30	20.2	25
28.8	10.67	80	53.5	3	20.09	33	23.9	11	7.46	30	54.1	21	12.92	32	18.0	22
Aug. 7.8	11.50	83	53.7	2	20.43	34	25.0	11	7.77	31	52.4	17	13.26	34	16.2	18
17.7	12.34	84	54.3	6	20.77	34	26.2	12	8.09	32	51.1	13	13.60	34	14.9	13
27.7	13.17	83	55.3	10	21.10	33	27.4	12	8.40	31	50.2	9	13.94	34	14.1	8
Sept. 6.7	13.98	81	56.7	14	21.43	33	28.5	11	8.70	30	49.7	5	14.27	33	13.9	2
16.7	14.76	78	58.5	18	21.74	31	29.6	11	8.99	29	49.7	0	14.59	32	14.2	3
26.6	15.50	74	60.6	21	22.03	29	30.7	11	9.26	27	50.2	5	14.88	29	15.0	8
Oct. 6.6	16.18	68	62.9	23	22.30	27	31.7	10	9.50	24	51.2	10	15.15	27	16.4	14
16.6	16.79	61	65.5	26	22.54	24	32.5	8	9.72	22	52.5	13	15.38	23	18.2	18
26.6	17.31	52	68.3	28	22.76	22	33.3	8	9.91	19	54.2	17	15.58	20	20.4	22
Nov. 5.5	17.74	43	71.3	30	22.95	19	34.0	7	10.06	15	56.2	20	15.74	16	22.9	25
15.5	18.08	34	74.3	30	23.11	16	34.5	5	10.18	12	58.3	21	15.86	12	25.5	26
25.5	18.31	23	77.4	31	23.23	12	35.0	5	10.27	9	60.5	22	15.93	7	28.3	28
Dec. 5.4	18.43	12	80.4	30	23.32	9	35.4	4	10.32	5	62.8	23	15.96	3	31.1	28
15.4	18.43	0	83.2	28	23.37	5	35.8	4	10.33	1	65.0	22	15.95	1	33.7	26
25.4	18.30	13	85.8	26	23.38	1	36.0	2	10.30	3	67.0	20	15.89	6	36.1	24
35.4	18.06	24	88.1	23	23.35	3	36.1	1	10.24	6	68.8	18	15.79	10	38.2	21
Sec δ, Tan δ	3.082		+2.916		1.093		+0.442		1.090		−0.435		1.243		−0.739	
Mean Place	$9^{s}.325$		$55''.17$		$18^{s}.596$		$12''.62$		$6^{s}.272$		$79''.84$		$11^{s}.944$		$46''.95$	
$D'_\psi\ \alpha$, $D_\omega\ \alpha$	+0.06		−0.11		+0.01		−0.02		−0.01		+0.02		−0.02		+0.03	
$D_\psi\ \delta$, $D_\omega\ \delta$	+0.2		+0.8		+0.2		+0.8		+0.2		+0.8		+0.2		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**γ Hydri.** Mag. 3.2				**ζ Persei.** Mag. 2.9				**9 H. Camelop.** Mag. 5.2				**ε Persei.** Mag. 3.0			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 3 48 s		° ′ −74 29 ″		h m 3 48 s		° ′ +31 37 ″		h m 3 49 s		° ′ +60 51 ″		h m 3 52 s		° ′ +39 45 ″	
Jan. 0.4	39.30	66	87.7	20	40.43	5	46.6	5	43.91	16	36.1	17	1.65	7	48.2	9
10.4	38.64	74	89.7	14	40.38	10	47.1	3	43.75	22	37.8	14	1.58	11	49.1	6
20.3	37.90	81	91.1	9	40.28	13	47.4	1	43.53	28	39.2	10	1.47	15	49.7	4
30.3	37.09	86	92.0	3	40.15	16	47.5	1	43.25	33	40.2	5	1.32	18	50.1	1
Feb. 9.3	36.23	88	92.3	3	39.99	17	47.4	3	42.92	35	40.7	0	1.14	20	50.2	2
19.2	35.35	87	92.0	8	39.82	18	47.1	4	42.57	36	40.7	4	0.94	21	50.0	4
Mar. 1.2	34.48	84	91.2	14	39.64	18	46.7	6	42.21	35	40.3	9	0.73	20	49.6	7
11.2	33.64	79	89.8	19	39.46	16	46.1	7	41.86	32	39.4	13	0.53	18	48.9	9
21.2	32.85	72	87.9	24	39.30	13	45.4	8	41.54	27	38.1	16	0.35	15	48.0	10
31.1	32.13	62	85.5	27	39.17	10	44.6	9	41.27	20	36.5	19	0.20	11	47.0	12
Apr. 10.1	31.51	52	82.8	31	39.07	5	43.7	8	41.07	13	34.6	20	0.09	7	45.8	12
20.1	30.99	40	79.7	33	39.02	0	42.9	8	40.94	4	32.6	21	0.02	1	44.6	12
30.1	30.59	26	76.4	35	39.02	5	42.1	7	40.90	5	30.5	22	0.01	5	43.4	11
May 10.0	30.33	13	72.9	36	39.07	10	41.4	5	40.95	14	28.3	21	0.06	10	42.3	10
20.0	30.20	1	69.3	37	39.17	15	40.9	3	41.09	22	26.2	19	0.16	16	41.3	8
30.0	30.21	15	65.6	36	39.32	21	40.6	2	41.31	30	24.3	17	0.32	22	40.5	7
June 8.9	30.36	29	62.0	35	39.53	25	40.4	0	41.61	38	22.6	14	0.54	27	39.8	4
18.9	30.65	42	58.5	32	39.78	28	40.4	2	41.99	44	21.2	12	0.81	30	39.4	2
28.9	31.07	53	55.3	29	40.06	31	40.6	5	42.43	49	20.0	8	1.11	34	39.2	1
July 8.9	31.60	63	52.4	25	40.37	34	41.1	6	42.92	53	19.2	4	1.45	37	39.3	3
18.8	32.23	72	49.9	21	40.71	36	41.7	8	43.45	56	18.8	1	1.82	38	39.6	5
28.8	32.95	78	47.8	15	41.07	36	42.5	9	44.01	58	18.7	3	2.20	39	40.1	7
Aug. 7.8	33.73	81	46.3	10	41.43	36	43.4	11	44.59	58	19.0	6	2.59	40	40.8	9
17.8	34.54	83	45.3	3	41.79	35	44.5	11	45.17	58	19.6	10	2.99	39	41.7	11
27.7	35.37	82	45.0	3	42.14	35	45.6	12	45.75	57	20.6	13	3.38	38	42.8	12
Sept. 6.7	36.19	78	45.3	9	42.49	33	46.8	13	46.32	55	21.9	15	3.76	37	44.0	13
16.7	36.97	72	46.2	15	42.82	32	48.1	12	46.87	52	23.4	18	4.13	35	45.3	14
26.6	37.69	63	47.7	21	43.14	29	49.3	12	47.39	48	25.2	21	4.48	32	46.7	15
Oct. 6.6	38.32	53	49.8	25	43.43	27	50.5	12	47.87	44	27.3	23	4.80	30	48.2	15
16.6	38.85	40	52.3	29	43.70	24	51.7	11	48.31	39	29.6	24	5.10	26	49.7	15
26.6	39.25	26	55.2	32	43.94	21	52.8	11	48.70	33	32.0	25	5.36	23	51.2	15
Nov. 5.5	39.51	11	58.4	33	44.15	18	53.9	10	49.03	27	34.5	26	5.59	20	52.7	15
15.5	39.62	4	61.7	34	44.33	14	54.9	9	49.30	20	37.1	25	5.79	16	54.2	14
25.5	39.58	20	65.1	33	44.47	10	55.8	9	49.50	12	39.6	25	5.95	11	55.6	14
Dec. 5.5	39.38	34	68.4	30	44.57	6	56.7	8	49.62	5	42.1	24	6.06	6	57.0	12
15.4	39.04	47	71.4	27	44.63	1	57.5	7	49.67	3	44.5	22	6.12	1	58.2	11
25.4	38.57	59	74.1	23	44.64	3	58.2	5	49.64	11	46.7	20	6.13	4	59.3	10
35.4	37.98		76.4		44.61		58.7		49.53		48.7		6.09		60.3	
Sec δ, Tan δ	3.743		−3.607		1.174		+0.616		2.053		+1.793		1.301		+0.832	
Mean Place	34ˢ.375		80″.92		39ˢ.574		33″.85		42ˢ.558		18″.09		0ˢ.709		33″.88	
D′ψ α, Dω α	−0.08		+0.13		+0.01		−0.02		+0.04		−0.06		+0.02		−0.03	
Dψ δ, Dω δ	+0.2		+0.8		+0.2		+0.8		+0.2		+0.8		+0.2		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ Persei. Mag. 4.0				γ Eridani. Mag. 3.2				λ Tauri. Var. 3.3–4.2				δ Reticuli. Mag. 4.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	3 53		+35 32		3 53		−13 44		3 55		+12 14		3 57		−61 38	
	s		″		s		″		s		″		s		″	
Jan. 0.4	19.90		43.1		59.23		77.0		52.40		51.2		24.50		48.5	
10.4	19.84	6	43.8	7	59.17	6	78.4	14	52.36	4	50.9	3	24.20	30	50.7	22
20.3	19.74	10	44.3	5	59.07	10	79.6	12	52.28	8	50.5	4	23.84	36	52.4	17
30.3	19.61	13	44.6	3	58.95	12	80.5	9	52.17	11	50.1	4	23.44	40	53.5	11
Feb. 9.3	19.44	17	44.6	0	58.80	15	81.1	6	52.04	13	49.7	4	23.01	43	54.1	6
19.2	19.25	19	44.4	2	58.64	16	81.5	4	51.89	15	49.4	3	22.56	45	54.1	0
Mar. 1.2	19.06	19	44.0	4	58.47	17	81.6	1	51.73	16	49.1	3	22.10	46	53.6	5
11.2	18.87	19	43.4	6	58.30	17	81.3	3	51.58	15	48.9	2	21.65	45	52.5	11
21.2	18.70	17	42.6	8	58.15	15	80.7	6	51.44	14	48.7	2	21.23	42	50.9	16
31.1	18.56	14	41.7	9	58.02	13	79.9	8	51.32	12	48.6	1	20.85	38	48.8	21
Apr. 10.1	18.45	11	40.7	10	57.92	10	78.8	11	51.23	9	48.6	0	20.52	33	46.3	25
20.1	18.39	6	39.7	10	57.85	7	77.4	14	51.17	6	48.7	1	20.25	27	43.4	29
30.1	18.38	1	38.7	10	57.82	3	75.8	16	51.16	1	49.0	3	20.05	20	40.3	31
May 10.0	18.42	4	37.8	9	57.84	2	74.0	18	51.20	4	49.4	4	19.93	12	36.9	34
20.0	18.52	10	37.0	8	57.91	7	71.9	21	51.28	8	50.0	6	19.89	4	33.3	36
30.0	18.68	16	36.4	6	58.02	11	69.7	22	51.41	13	50.7	7	19.93	4	29.7	36
June 8.9	18.89	21	36.0	4	58.17	15	67.4	23	51.58	17	51.6	9	20.06	13	26.1	36
18.9	19.14	25	35.8	2	58.36	19	65.1	23	51.79	21	52.7	11	20.27	21	22.6	35
28.9	19.43	29	35.8	0	58.59	23	62.8	23	52.04	25	53.9	12	20.54	27	19.3	33
July 8.9	19.75	32	36.0	2	58.84	25	60.5	23	52.31	27	55.2	13	20.88	34	16.2	31
18.8	20.10	35	36.5	5	59.12	28	58.4	21	52.60	29	56.5	13	21.28	40	13.5	27
28.8	20.47	37	37.1	6	59.42	30	56.5	19	52.91	31	57.8	13	21.73	45	11.2	23
Aug. 7.8	20.84	37	37.9	8	59.72	30	54.8	17	53.23	32	59.1	13	22.21	48	9.5	17
17.8	21.22	38	38.9	10	60.03	31	53.4	14	53.55	32	60.3	12	22.71	50	8.3	12
27.7	21.59	37	40.0	11	60.33	30	52.4	10	53.86	31	61.4	11	23.21	50	7.7	6
Sept. 6.7	21.95	36	41.2	12	60.63	30	51.7	7	54.16	30	62.4	10	23.71	50	7.7	0
16.7	22.30	35	42.4	12	60.91	28	51.5	2	54.46	30	63.2	8	24.19	48	8.4	7
26.6	22.63	33	43.7	13	61.18	27	51.7	2	54.74	28	63.8	6	24.63	44	9.7	13
Oct. 6.6	22.94	31	45.0	13	61.43	25	52.2	5	55.00	26	64.2	4	25.03	40	11.5	18
16.6	23.22	28	46.3	13	61.65	22	53.1	9	55.24	24	64.5	3	25.38	35	13.8	23
26.6	23.48	26	47.6	13	61.85	20	54.3	12	55.45	21	64.6	1	25.66	28	16.6	28
Nov. 5.5	23.70	22	48.9	13	62.02	17	55.8	15	55.64	19	64.5	1	25.86	20	19.7	31
15.5	23.89	19	50.1	12	62.16	14	57.5	17	55.80	16	64.3	2	25.99	13	23.0	33
25.5	24.04	15	51.3	12	62.26	10	59.3	18	55.93	13	64.0	3	26.04	5	26.4	34
Dec. 5.5	24.15	11	52.4	11	62.33	7	61.1	18	56.02	9	63.7	3	26.01	3	29.7	33
15.4	24.22	7	53.4	10	62.36	3	62.9	18	56.08	6	63.3	4	25.89	12	32.8	31
25.4	24.24	2	54.3	9	62.36	0	64.6	17	56.10	2	62.9	4	25.70	19	35.6	28
35.4	24.21	3	55.0	7	62.32	4	66.1	15	56.08	2	62.5	4	25.44	26	38.1	25
Sec δ, Tan δ	1.229		+0.715		1.030		−0.245		1.023		+0.217		2.105		−1.853	
Mean Place	18ˢ.983		29″.67		58ˢ.196		79″.36		51ˢ.516		42″.92		21ˢ.805		43″.24	
D′ψ α, Dω α	+0.02		−0.03		−0.01		+0.01		0.00		−0.01		−0.04		+0.06	
Dψ δ, Dω δ	+0.2		+0.9		+0.2		+0.9		+0.2		+0.9		+0.2		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ν Tauri. Mag. 3.9				A Tauri. Mag. 4.5				c Persei. Mag. 4.0				p Tauri. Mag. 5.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 3 58		° ′ + 5 44		h m 3 59		° ′ +21 50		h m 4 2		° ′ +47 28		h m 4 5		° ′ +26 15	
	s		″		s		″		s		″		s		″	
Jan. 0.4	32.53		61.9		33.86		52.5		21.57		67.7		32.72		28.3	
10.4	32.49	4	61.2	7	33.82	4	52.5	0	21.49	8	68.9	12	32.68	4	28.5	2
20.3	32.42	7	60.6	6	33.74	8	52.5	0	21.37	12	69.9	10	32.60	8	28.7	2
30.3	32.31	11	60.1	5	33.63	11	52.4	1	21.20	17	70.6	7	32.48	12	28.7	0
Feb. 9.3	32.18	13	59.7	4	33.49	14	52.2	2	20.99	21	70.9	3	32.34	14	28.6	1
19.3	32.03	15	59.3	4	33.33	16	51.9	3	20.76	23	70.9	0	32.18	16	28.4	2
Mar. 1.2	31.87	16	59.0	3	33.17	16	51.6	3	20.52	24	70.6	3	32.01	17	28.1	3
11.2	31.72	15	58.9	1	33.01	16	51.2	4	20.28	24	70.0	6	31.84	17	27.7	4
21.2	31.58	14	58.9	0	32.86	15	50.8	4	20.05	23	69.0	10	31.68	16	27.2	5
31.1	31.46	12	59.0	1	32.73	13	50.4	4	19.86	19	67.8	12	31.54	14	26.6	6
Apr. 10.1	31.37	9	59.3	3	32.63	10	50.0	4	19.72	14	66.5	13	31.43	11	26.0	6
20.1	31.31	6	59.8	5	32.57	6	49.6	4	19.63	9	65.0	15	31.37	6	25.5	5
30.1	31.29	2	60.4	6	32.56	1	49.3	3	19.60	3	63.4	16	31.35	2	25.0	5
May 10.0	31.32	3	61.2	8	32.60	4	49.2	1	19.63	3	61.9	15	31.38	3	24.6	4
20.0	31.40	8	62.1	9	32.69	9	49.2	0	19.73	10	60.4	15	31.47	9	24.3	3
30.0	31.52	12	63.2	11	32.82	13	49.4	2	19.89	16	59.1	13	31.60	13	24.2	1
June 9.0	31.68	16	64.5	13	33.00	18	49.7	3	20.12	23	58.0	11	31.78	18	24.3	1
18.9	31.88	20	65.9	14	33.22	22	50.2	5	20.40	28	57.1	9	32.00	22	24.6	3
28.9	32.12	24	67.4	15	33.47	25	50.9	7	20.73	33	56.5	6	32.26	26	25.0	4
July 8.9	32.38	26	68.9	15	33.76	29	51.7	8	21.10	37	56.1	4	32.55	29	25.5	5
18.8	32.67	29	70.4	15	34.07	31	52.7	10	21.50	40	56.0	1	32.87	32	26.2	7
28.8	32.97	30	71.9	15	34.39	32	53.7	10	21.92	42	56.2	2	33.20	33	27.1	9
Aug. 7.8	33.27	30	73.3	14	34.72	33	54.7	10	22.35	43	56.6	4	33.54	34	28.0	9
17.8	33.58	31	74.6	13	35.06	34	55.8	11	22.79	44	57.3	7	33.88	34	29.0	10
27.7	33.89	31	75.7	11	35.39	33	56.9	11	23.23	44	58.2	9	34.22	34	30.0	10
Sept. 6.7	34.19	30	76.6	9	35.71	32	57.9	10	23.66	43	59.3	11	34.56	34	31.0	10
16.7	34.48	29	77.2	6	36.02	31	58.8	9	24.08	42	60.6	13	34.88	32	32.0	10
26.7	34.75	27	77.6	4	36.32	30	59.7	9	24.48	40	62.0	14	35.19	31	32.9	9
Oct. 6.6	35.01	26	77.8	2	36.60	28	60.5	8	24.85	37	63.6	16	35.48	29	33.8	9
16.6	35.24	23	77.8	0	36.85	25	61.2	7	25.19	34	65.3	17	35.75	27	34.6	8
26.6	35.45	21	77.5	3	37.08	23	61.8	6	25.50	31	67.1	18	36.00	25	35.4	8
Nov. 5.5	35.64	19	77.1	4	37.29	21	62.2	4	25.78	28	68.9	18	36.22	22	36.1	7
15.5	35.80	16	76.5	6	37.46	17	62.6	4	26.01	23	70.8	19	36.40	18	36.7	6
25.5	35.92	12	75.8	7	37.60	14	62.9	3	26.19	18	72.6	18	36.55	15	37.3	6
Dec. 5.5	36.01	9	75.1	7	37.71	11	63.2	3	26.32	13	74.4	18	36.67	12	37.8	5
15.4	36.07	6	74.3	8	37.78	7	63.4	2	26.40	8	76.1	17	36.75	8	38.2	4
25.4	36.09	2	73.5	8	37.80	2	63.5	1	26.42	2	77.6	15	36.78	3	38.6	4
35.4	36.07	2	72.8	7	37.79	1	63.6	1	26.38	4	79.0	14	36.77	1	38.9	3
Sec δ, Tan δ	1.005		+0.101		1.077		+0.401		1.480		+1.091		1.115		+0.493	
Mean Place	31s.622		55″.03		32s.966		42″.00		20s.456		52″.18		31s.781		16″.88	
D′ψ α, Dω α	0.00		0.00		+0.01		−0.01		+0.03		−0.04		+0.01		−0.02	
Dψ δ, Dω δ	+0.2		+0.9		+0.2		+0.9		+0.2		+0.9		+0.2		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	o^1 **Eridani.** Mag. 4.1				μ **Tauri.** Mag. 4.3				α **Horologii.** Mag. 3.8				α **Reticuli.** Mag. 3.4			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	4 7		− 7 3		4 10		+ 8 40		4 11		−42 29		4 13		−62 40	
	s		″		s		″		s		″		s		″	
Jan. 0.4	38.10		45.1		49.47		38.4		8.77		93.5		20.88		93.2	
10.4	38.05	5	46.3	12	49.44	3	37.8	6	8.64	13	95.7	22	20.58	30	95.5	23
20.3	37.97	8	47.4	11	49.37	7	37.3	5	8.47	17	97.5	18	20.22	36	97.4	19
30.3	37.86	11	48.2	8	49.27	10	36.9	4	8.27	20	98.8	13	19.81	41	98.8	14
Feb. 9.3	37.72	14	48.8	6	49.15	12	36.5	4	8.03	24	99.7	9	19.36	45	99.6	8
19.3	37.57	15	49.2	4	49.00	15	36.2	3	7.77	26	100.1	4	18.89	47	99.8	2
Mar. 1.2	37.41	16	49.4	2	48.84	16	35.9	3	7.50	27	100.0	1	18.40	49	99.5	3
11.2	37.25	16	49.3	1	48.68	16	35.7	2	7.24	26	99.4	6	17.92	48	98.7	8
21.2	37.10	15	49.0	3	48.53	15	35.6	1	6.99	25	98.3	11	17.47	45	97.3	14
31.2	36.97	13	48.4	6	48.40	13	35.6	0	6.77	22	96.8	15	17.05	42	95.4	19
Apr. 10.1	36.86	11	47.6	8	48.30	10	35.8	2	6.58	19	94.8	20	16.68	37	93.1	23
20.1	36.79	7	46.6	10	48.24	6	36.1	3	6.43	15	92.5	23	16.37	31	90.4	27
30.1	36.76	3	45.4	12	48.22	2	36.5	4	6.32	11	89.8	27	16.13	24	87.3	31
May 10.0	36.77	1	43.9	15	48.24	2	37.1	6	6.27	5	86.9	29	15.97	16	84.0	33
20.0	36.82	5	42.2	17	48.30	6	37.9	8	6.28	1	83.8	31	15.89	8	80.6	34
30.0	36.92	10	40.4	18	48.41	11	38.8	9	6.34	6	80.6	32	15.90	1	77.0	36
June 9.0	37.07	15	38.5	19	48.57	16	39.8	10	6.45	11	77.3	33	15.99	9	73.4	36
18.9	37.25	18	36.5	20	48.76	19	41.0	12	6.62	17	74.0	33	16.17	18	69.8	36
28.9	37.47	22	34.4	21	48.99	23	42.3	13	6.84	22	70.8	32	16.42	25	66.4	34
July 8.9	37.72	25	32.4	20	49.25	26	43.7	14	7.10	26	67.8	30	16.74	32	63.3	31
18.9	37.99	27	30.5	19	49.53	28	45.1	14	7.39	29	65.1	27	17.12	38	60.5	28
28.8	38.28	29	28.7	18	49.83	30	46.4	13	7.71	32	62.7	24	17.56	44	58.1	24
Aug. 7.8	38.58	30	27.1	16	50.14	31	47.7	13	8.05	34	60.8	19	18.04	48	56.2	19
17.8	38.88	30	25.8	13	50.45	31	48.9	12	8.41	36	59.4	14	18.54	50	54.8	14
27.7	39.18	30	24.7	11	50.76	31	49.9	10	8.77	36	58.5	9	19.06	52	54.0	8
Sept. 6.7	39.48	30	23.9	8	51.06	30	50.8	9	9.13	36	58.1	4	19.58	52	53.9	1
16.7	39.77	29	23.5	4	51.36	30	51.5	7	9.47	34	58.3	2	20.08	50	54.4	5
26.7	40.04	27	23.5	0	51.64	28	52.0	5	9.80	33	59.1	8	20.55	47	55.5	11
Oct. 6.6	40.29	25	23.8	3	51.90	26	52.2	2	10.10	30	60.5	14	20.98	43	57.2	17
16.6	40.53	24	24.4	6	52.15	25	52.2	0	10.37	27	62.4	19	21.36	38	59.5	23
26.6	40.74	21	25.3	9	52.38	23	52.1	1	10.60	23	64.7	23	21.67	31	62.2	27
Nov. 5.6	40.92	18	26.5	12	52.58	20	51.8	3	10.79	19	67.4	27	21.91	24	65.2	30
15.5	41.08	16	27.9	14	52.75	17	51.3	5	10.94	15	70.3	29	22.07	16	68.5	33
25.5	41.20	12	29.3	14	52.89	14	50.7	6	11.04	10	73.3	30	22.15	8	71.9	34
Dec. 5.5	41.29	9	30.8	15	52.99	10	50.1	6	11.09	5	76.3	30	22.14	1	75.3	34
15.4	41.34	5	32.3	15	53.06	7	49.5	6	11.09	0	79.3	30	22.05	9	78.5	32
25.4	41.36	2	33.8	15	53.09	3	48.9	6	11.04	5	82.1	28	21.87	18	81.5	30
35.4	41.34	2	35.1	13	53.09	0	48.3	6	10.94	10	84.5	24	21.62	25	84.2	27
Sec δ, Tan δ	1.008		−0.124		1.012		+0.153		1.356		−0.917		2.180		−1.937	
Mean Place	37ˢ.080		49″.33		48ˢ.522		30″.76		7ˢ.122		91″.44		18ˢ.011		89″.16	
D′ψ α, Dω α	0.00		0.00		0.00		0.00		−0.02		+0.03		−0.05		+0.06	
Dψ δ, Dω δ	+0.2		+0.9		+0.2		+0.9		+0.2		+0.9		+0.2		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Tauri. Mag. 3.9				δ Tauri. Mag. 3.9				υ⁵ Eridani. Mag. 4.1				ε Tauri. Mag. 3.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 4 14		° ′ +15 25		h m 4 17		° ′ +17 20		h m 4 20		° ′ −34 12		h m 4 23		° ′ +18 59	
	s		″		s		″		s		″		s		″	
Jan. 0.4	51.39		15.0		55.90		30.8		47.57		66.6		33.08		27.6	
10.4	51.36	3	14.8	2	55.88	2	30.6	2	47.48	9	68.7	21	33.06	2	27.6	0
20.3	51.30	6	14.6	2	55.82	6	30.4	2	47.35	13	70.5	18	33.00	6	27.5	1
30.3	51.20	10	14.3	3	55.72	10	30.2	2	47.19	16	71.9	14	32.90	10	27.3	2
Feb. 9.3	51.07	13	14.0	3	55.59	13	30.0	2	47.00	19	72.9	10	32.77	13	27.1	2
19.3	50.92	15	13.7	3	55.44	15	29.8	2	46.78	22	73.4	5	32.62	15	26.9	2
Mar. 1.2	50.76	16	13.5	2	55.27	17	29.5	3	46.55	23	73.4	0	32.46	16	26.7	2
11.2	50.60	16	13.2	3	55.11	16	29.2	3	46.33	22	73.0	4	32.30	16	26.4	3
21.2	50.45	15	13.0	2	54.96	15	29.0	2	46.11	22	72.2	8	32.14	16	26.1	3
31.2	50.32	13	12.8	2	54.82	14	28.8	2	45.91	20	70.9	13	32.00	14	25.8	3
Apr. 10.1	50.21	11	12.7	1	54.71	11	28.6	2	45.74	17	69.2	17	31.89	11	25.6	2
20.1	50.14	7	12.6	1	54.64	7	28.5	1	45.61	13	67.2	20	31.81	8	25.4	2
30.1	50.12	2	12.7	1	54.61	3	28.4	1	45.52	9	64.9	23	31.78	3	25.3	1
May 10.0	50.14	2	12.9	2	54.63	2	28.5	1	45.48	4	62.3	26	31.79	1	25.3	0
20.0	50.21	7	13.3	4	54.70	7	28.7	2	45.50	2	59.5	28	31.85	6	25.4	1
30.0	50.32	11	13.8	5	54.81	11	29.1	4	45.56	6	56.5	30	31.96	11	25.7	3
June 9.0	50.48	16	14.5	7	54.97	16	29.7	6	45.67	11	53.5	30	32.12	16	26.1	4
18.9	50.68	20	15.3	8	55.17	20	30.4	7	45.83	16	50.4	31	32.31	19	26.7	6
28.9	50.91	23	16.2	9	55.40	23	31.2	8	46.03	20	47.4	30	32.54	23	27.4	7
July 8.9	51.17	26	17.2	10	55.66	26	32.1	9	46.27	24	44.5	29	32.80	26	28.2	8
18.9	51.46	29	18.3	11	55.95	29	33.1	10	46.54	27	41.9	26	33.09	29	29.1	9
28.8	51.77	31	19.4	11	56.26	31	34.1	10	46.84	30	39.6	23	33.40	31	30.0	9
Aug. 7.8	52.08	31	20.5	11	56.58	32	35.2	11	47.16	32	37.6	20	33.72	32	31.0	10
17.8	52.40	32	21.6	11	56.90	32	36.2	10	47.49	33	36.1	15	34.04	32	32.0	10
27.7	52.72	32	22.6	10	57.22	32	37.2	10	47.82	33	35.1	10	34.37	33	32.9	9
Sept. 6.7	53.03	31	23.5	9	57.54	32	38.1	9	48.15	33	34.6	5	34.69	32	33.7	8
16.7	53.34	31	24.3	8	57.85	31	38.9	8	48.47	32	34.6	0	35.01	32	34.5	8
26.7	53.63	29	24.9	6	58.15	30	39.5	6	48.77	30	35.2	6	35.31	30	35.2	7
Oct. 6.6	53.91	28	25.4	5	58.43	28	40.0	5	49.06	29	36.3	11	35.60	29	35.7	5
16.6	54.17	26	25.7	3	58.69	26	40.4	4	49.32	26	37.9	16	35.87	27	36.1	4
26.6	54.40	23	25.8	1	58.93	24	40.6	2	49.55	23	39.9	20	36.12	25	36.4	3
Nov. 5.6	54.61	21	25.8	0	59.15	22	40.7	1	49.75	20	42.2	23	36.34	22	36.6	2
15.5	54.79	18	25.8	0	59.34	19	40.8	1	49.91	16	44.8	26	36.53	19	36.7	1
25.5	54.94	15	25.7	1	59.49	15	40.7	1	50.03	12	47.6	28	36.69	16	36.7	0
Dec. 5.5	55.06	12	25.5	2	59.61	12	40.6	1	50.10	7	50.4	28	36.82	13	36.7	0
15.4	55.14	8	25.2	3	59.70	9	40.5	1	50.13	3	53.1	27	36.91	9	36.7	0
25.4	55.18	4	25.0	2	59.74	4	40.4	1	50.11	2	55.7	26	36.96	5	36.6	1
35.4	55.18	0	24.7	3	59.74	0	40.2	2	50.05	6	58.1	24	36.97	1	36.5	1
Sec δ, Tan δ	1.037		+0.276		1.048		+0.312		1.209		−0.680		1.058		+0.344	
Mean Place	50ˢ.431		5″.94		54ˢ.928		21″.32		46ˢ.127		66″.36		32ˢ.083		17″.84	
D′ψ α, Dω α	+0.01		−0.01		+0.01		−0.01		−0.02		+0.02		+0.01		−0.01	
Dψ δ, Dω δ	+0.2		+0.9		+0.2		+0.9		+0.2		+0.9		+0.2		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**δ Mensæ.**				**m Persei.**				**α Tauri.**				**ν Eridani.**			
	Mag. 5.6				Mag. 6.1				Mag. 1.1				Mag. 4.1			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	4 23		−80 24		4 27		+42 52		4 30		+16 20		4 31		− 3 31	
	s		″		s		″		s		″		s		″	
Jan. 0.4	57.92	101	70.6	24	18.61	4	58.4	12	56.62	2	16.0	2	59.32	2	40.9	11
10.4	56.91	118	73.0	18	18.57	9	59.6	9	56.60	5	15.8	3	59.30	6	42.0	10
20.4	55.73	132	74.8	13	18.48	14	60.5	7	56.55	9	15.5	2	59.24	10	43.0	9
30.3	54.41	142	76.1	8	18.34	17	61.2	5	56.46	12	15.3	2	59.14	13	43.9	7
Feb. 9.3	52.99	147	76.9	2	18.17	20	61.7	1	56.34	15	15.1	2	59.01	15	44.6	4
19.3	51.52	149	77.1	3	17.97	22	61.8	1	56.19	16	14.9	3	58.86	16	45.0	2
Mar. 1.2	50.03	147	76.8	9	17.75	23	61.7	4	56.03	16	14.6	2	58.70	16	45.2	1
11.2	48.56	142	75.9	14	17.52	21	61.3	7	55.87	16	14.4	2	58.54	16	45.3	1
21.2	47.14	133	74.5	19	17.31	19	60.6	9	55.71	14	14.2	2	58.38	14	45.2	4
31.2	45.81	120	72.6	23	17.12	15	59.7	10	55.57	12	14.0	1	58.24	12	44.8	6
Apr. 10.1	44.61	106	70.3	26	16.97	11	58.7	12	55.45	8	13.9	1	58.12	9	44.2	8
20.1	43.55	88	67.7	30	16.86	5	57.5	13	55.37	4	13.8	0	58.03	5	43.4	10
30.1	42.67	69	64.7	33	16.81	1	56.2	13	55.33	1	13.8	1	57.98	1	42.4	12
May 10.1	41.98	48	61.4	34	16.82	7	54.9	12	55.34	5	13.9	3	57.97	4	41.2	14
20.0	41.50	26	58.0	35	16.89	12	53.7	11	55.39	10	14.2	4	58.01	8	39.8	15
30.0	41.24	3	54.5	35	17.01	18	52.6	10	55.49	14	14.6	6	58.09	13	38.3	17
June 9.0	41.21	19	51.0	34	17.19	24	51.6	8	55.63	19	15.2	7	58.22	17	36.6	18
18.9	41.40	41	47.6	33	17.43	29	50.8	6	55.82	22	15.9	8	58.39	20	34.8	18
28.9	41.81	61	44.3	31	17.72	32	50.2	4	56.04	25	16.7	8	58.59	23	33.0	18
July 8.9	42.42	79	41.2	27	18.04	35	49.8	2	56.29	28	17.5	10	58.82	25	31.2	18
18.9	43.21	96	38.5	23	18.39	38	49.6	1	56.57	30	18.5	10	59.07	28	29.4	17
28.8	44.17	110	36.2	18	18.77	40	49.7	3	56.87	31	19.5	10	59.35	29	27.7	15
Aug. 7.8	45.27	119	34.4	13	19.17	41	50.0	5	57.18	32	20.5	10	59.64	30	26.2	13
17.8	46.46	126	33.1	7	19.58	41	50.5	6	57.50	32	21.5	9	59.94	30	24.9	10
27.8	47.72	128	32.4	1	19.99	41	51.1	8	57.82	32	22.4	8	60.24	30	23.9	8
Sept. 6.7	49.00	126	32.3	5	20.40	40	51.9	9	58.14	31	23.2	7	60.54	30	23.1	4
16.7	50.26	119	32.8	12	20.80	38	52.8	11	58.45	30	23.9	5	60.84	28	22.7	1
26.7	51.45	109	34.0	17	21.18	37	53.9	12	58.75	29	24.4	4	61.12	27	22.6	2
Oct. 6.6	52.54	94	35.7	23	21.55	35	55.1	13	59.04	27	24.8	3	61.39	25	22.8	5
16.6	53.48	75	38.0	27	21.90	32	56.4	14	59.31	25	25.1	1	61.64	23	23.3	8
26.6	54.23	54	40.7	30	22.22	28	57.8	14	59.56	22	25.2	0	61.87	21	24.1	10
Nov. 5.6	54.77	31	43.7	33	22.50	25	59.2	14	59.78	20	25.2	1	62.08	18	25.1	12
15.5	55.08	6	47.0	34	22.75	21	60.6	15	59.98	17	25.1	2	62.26	15	26.3	14
25.5	55.14	20	50.4	33	22.96	16	62.1	15	60.15	13	24.9	2	62.41	11	27.7	14
Dec. 5.5	54.94	44	53.7	32	23.12	11	63.6	14	60.28	10	24.7	2	62.52	8	29.1	14
15.5	54.50	68	56.9	30	23.23	6	65.0	13	60.38	6	24.5	2	62.60	4	30.5	13
25.4	53.82	90	59.9	26	23.29	0	66.3	12	60.44	1	24.3	3	62.64	1	31.8	13
35.4	52.92		62.5		23.29		67.5		60.45		24.0		62.65		33.1	
Sec δ, Tan δ	6.006		−5.922		1.364		+0.929		1.042		+0.293		1.002		−0.062	
Mean Place	$49^{s}.572$		$66''.81$		$17^{s}.396$		$44''.47$		$55^{s}.598$		$6''.72$		$58^{s}.248$		$46''.43$	
$D'_{\psi}\,a$, $D_{\omega}\,a$	−0.14		+0.15		+0.02		−0.02		+0.01		−0.01		0.00		0.00	
$D'_{\psi}\,\delta$, $D_{\omega}\,\delta$	+0.2		+0.9		+0.2		+0.9		+0.2		+0.9		+0.1		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Doradus. Mag. 3.5				53 Eridani. Mag. 4.0				τ Tauri. Mag. 4.3				Groombridge 848. Mag. 6.0			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	4 32		−55 12		4 34		−14 27		4 37		+22 47		4 37		+75 47	
	s		″		s		″		s		″		s		″	
Jan. 0.4	9.23	19	90.7	26	12.83	4	80.4	16	2.36	1	37.4	1	10.01	25	21.7	26
10.4	9.04	25	93.3	21	12.79	7	82.0	14	2.35	5	37.5	1	9.76	41	24.3	23
20.4	8.79	29	95.4	17	12.72	11	83.4	12	2.30	9	37.6	1	9.35	54	26.6	19
30.3	8.50	33	97.1	11	12.61	14	84.6	8	2.21	13	37.7	1	8.81	65	28.5	14
Feb. 9.3	8.17	36	98.2	6	12.47	16	85.4	6	2.08	15	37.6	1	8.16	73	29.9	8
19.3	7.81	38	98.8	0	12.31	17	86.0	3	1.93	17	37.5	2	7.43	77	30.7	3
Mar. 1.2	7.43	38	98.8	5	12.14	18	86.3	0	1.76	17	37.3	2	6.66	78	31.0	3
11.2	7.05	36	98.3	11	11.96	17	86.3	4	1.59	16	37.1	3	5.88	75	30.7	8
21.2	6.69	34	97.2	15	11.79	16	85.9	7	1.43	15	36.8	4	5.13	68	29.9	14
31.2	6.35	30	95.7	20	11.63	13	85.2	9	1.28	12	36.4	3	4.45	58	28.5	18
Apr. 10.1	6.05	25	93.7	24	11.50	10	84.3	12	1.16	9	36.1	3	3.87	46	26.7	21
20.1	5.80	20	91.3	27	11.40	6	83.1	15	1.07	5	35.8	3	3.41	31	24.6	24
30.1	5.60	14	88.6	31	11.34	2	81.6	17	1.02	0	35.5	2	3.10	15	22.2	26
May 10.1	5.46	7	85.5	33	11.32	2	79.9	20	1.02	5	35.3	1	2.95	1	19.6	27
20.0	5.39	0	82.2	34	11.34	7	77.9	21	1.07	10	35.2	0	2.96	18	16.9	26
30.0	5.39	7	78.8	35	11.41	11	75.8	22	1.17	14	35.2	1	3.14	35	14.3	26
June 9.0	5.46	14	75.3	35	11.52	16	73.6	23	1.31	19	35.3	3	3.49	50	11.7	24
18.9	5.60	20	71.8	34	11.68	19	71.3	23	1.50	23	35.6	4	3.99	64	9.3	21
28.9	5.80	26	68.4	32	11.87	23	69.0	22	1.73	26	36.0	5	4.63	77	7.2	19
July 8.9	6.06	31	65.2	29	12.10	25	66.8	22	1.99	28	36.5	7	5.40	87	5.3	15
18.9	6.37	36	62.3	26	12.35	27	64.6	20	2.27	31	37.2	7	6.27	96	3.8	12
28.8	6.73	39	59.7	21	12.62	29	62.6	17	2.58	32	37.9	8	7.23	103	2.6	8
Aug. 7.8	7.12	42	57.6	16	12.91	30	60.9	14	2.90	33	38.7	8	8.26	107	1.8	3
17.8	7.54	43	56.0	10	13.21	31	59.5	11	3.23	34	39.5	8	9.33	110	1.5	1
27.8	7.97	43	55.0	4	13.52	30	58.4	7	3.57	33	40.3	8	10.43	110	1.6	5
Sept. 6.7	8.40	42	54.6	2	13.82	29	57.7	3	3.90	32	41.1	7	11.53	109	2.1	9
16.7	8.82	41	54.8	8	14.11	28	57.4	1	4.22	32	41.8	6	12.62	107	3.0	13
26.7	9.23	38	55.6	14	14.39	27	57.5	5	4.54	30	42.4	5	13.69	102	4.3	16
Oct. 6.6	9.61	35	57.0	20	14.66	25	58.0	9	4.84	29	42.9	5	14.71	95	5.9	20
16.6	9.96	30	59.0	25	14.91	23	58.9	13	5.13	27	43.4	4	15.66	87	7.9	23
26.6	10.26	24	61.5	29	15.14	21	60.2	16	5.40	24	43.8	3	16.53	76	10.2	26
Nov. 5.6	10.50	18	64.4	32	15.35	18	61.8	18	5.64	21	44.1	3	17.29	64	12.8	28
15.5	10.68	12	67.6	33	15.53	14	63.6	19	5.85	18	44.4	2	17.93	50	15.6	30
25.5	10.80	6	70.9	34	15.67	11	65.5	20	6.03	15	44.6	2	18.43	36	18.6	30
Dec. 5.5	10.86	2	74.3	33	15.78	7	67.5	20	6.18	11	44.8	2	18.79	20	21.6	31
15.5	10.84	9	77.6	31	15.85	3	69.5	19	6.29	6	45.0	1	18.99	2	24.7	29
25.4	10.75	15	80.7	28	15.88	1	71.4	17	6.35	2	45.1	1	19.01	15	27.6	28
35.4	10.60		83.5		15.87		73.1		6.37		45.2		18.86		30.4	
Sec δ, Tan δ	1.753		−1.440		1.033		−0.258		1.085		+0.420		4.073		+3.948	
Mean Place	$6^{s}.930$		$88''.81$		$11^{s}.664$		$84''.09$		$1^{s}.298$		$27''.06$		$6^{s}.285$		$4''.45$	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	−0.03		+0.03		−0.01		+0.01		+0.01		−0.01		+0.10		−0.09	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	+0.1		+0.9		+0.1		+0.9		+0.1		+0.9		+0.1		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*α* Coeli. Mag. 4.5				4 Camelop. Mag. 5.4				*μ* Eridani. Mag. 4.2				π^3 Orionis. Mag. 3.3			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	4 37		−42 1		4 40		+56 36		4 41		− 3 24		4 45		+ 6 48	
	s		″		s		″		s		″		s		″	
Jan. 0.4	47.10	10	47.1	25	46.76	6	29.1	18	10.20	2	42.3	12	8.04	1	44.5	7
10.4	47.00	15	49.6	21	46.70	12	30.9	16	10.18	6	43.5	10	8.03	5	43.8	6
20.4	46.85	19	51.7	16	46.58	19	32.5	13	10.12	9	44.5	9	7.98	8	43.2	5
30.3	46.66	23	53.3	12	46.39	24	33.8	10	10.03	12	45.4	7	7.90	11	42.7	5
Feb. 9.3	46.43	25	54.5	7	46.15	28	34.8	5	9.91	15	46.1	5	7.79	14	42.2	4
19.3	46.18	27	55.2	2	45.87	31	35.3	1	9.76	16	46.6	3	7.65	16	41.8	2
Mar. 1.3	45.91	27	55.4	3	45.56	32	35.4	3	9.60	17	46.9	0	7.49	16	41.6	1
11.2	45.64	26	55.1	8	45.24	31	35.1	7	9.43	16	46.9	1	7.33	16	41.5	1
21.2	45.38	24	54.3	12	44.93	27	34.4	10	9.27	15	46.8	3	7.17	14	41.4	1
31.2	45.14	21	53.1	17	44.66	23	33.4	14	9.12	12	46.5	5	7.03	12	41.5	2
Apr. 10.1	44.93	18	51.4	21	44.43	18	32.0	16	9.00	9	46.0	8	6.91	9	41.7	3
20.1	44.75	13	49.3	24	44.25	11	30.4	18	8.91	6	45.2	10	6.82	6	42.0	5
30.1	44.62	8	46.9	27	44.14	3	28.6	19	8.85	1	44.2	12	6.76	1	42.5	6
May 10.1	44.54	3	44.2	30	44.11	5	26.7	19	8.84	3	43.0	13	6.75	4	43.1	8
20.0	44.51	3	41.2	31	44.16	12	24.8	18	8.87	7	41.7	15	6.79	8	43.9	9
30.0	44.54	8	38.1	32	44.28	20	23.0	18	8.94	12	40.2	17	6.87	12	44.8	11
June 9.0	44.62	13	34.9	33	44.48	27	21.2	16	9.06	16	38.5	17	6.99	16	45.9	12
19.0	44.75	18	31.6	32	44.75	34	19.6	14	9.22	19	36.8	18	7.15	20	47.1	13
28.9	44.93	23	28.4	31	45.09	39	18.2	11	9.41	23	35.0	18	7.35	23	48.4	13
July 8.9	45.16	27	25.3	28	45.48	44	17.1	9	9.64	25	33.2	17	7.58	26	49.7	13
18.9	45.43	30	22.5	25	45.92	47	16.2	6	9.89	27	31.5	17	7.84	28	51.0	13
28.8	45.73	33	20.0	21	46.39	50	15.6	3	10.16	29	29.8	15	8.12	29	52.3	12
Aug. 7.8	46.06	34	17.9	17	46.89	52	15.3	0	10.45	29	28.3	13	8.41	30	53.5	11
17.8	46.40	35	16.2	11	47.41	52	15.3	3	10.74	30	27.0	10	8.71	31	54.6	9
27.8	46.75	36	15.1	5	47.93	53	15.6	6	11.04	30	26.0	7	9.02	31	55.5	7
Sept. 6.7	47.11	35	14.6	0	48.46	52	16.2	8	11.34	29	25.3	5	9.33	30	56.2	5
16.7	47.46	33	14.6	6	48.98	51	17.0	11	11.63	29	24.8	1	9.63	29	56.7	3
26.7	47.79	32	15.2	12	49.49	49	18.1	13	11.92	27	24.7	2	9.92	29	57.0	1
Oct. 6.7	48.11	29	16.4	17	49.98	46	19.4	16	12.19	26	24.9	5	10.21	27	57.1	2
16.6	48.40	26	18.1	21	50.44	43	21.0	17	12.45	24	25.4	8	10.48	25	56.9	4
26.6	48.66	22	20.2	26	50.87	38	22.7	19	12.69	22	26.2	11	10.73	23	56.5	5
Nov. 5.6	48.88	18	22.8	29	51.25	33	24.6	20	12.91	19	27.3	12	10.96	20	56.0	6
15.5	49.06	14	25.7	30	51.58	28	26.6	21	13.10	16	28.5	14	11.16	17	55.4	8
25.5	49.20	8	28.7	31	51.86	22	28.7	22	13.26	12	29.9	14	11.33	14	54.6	9
Dec. 5.5	49.28	3	31.8	31	52.08	15	30.9	22	13.38	9	31.3	14	11.47	10	53.7	8
15.5	49.31	2	34.9	29	52.23	7	33.1	20	13.47	5	32.7	14	11.57	6	52.9	8
25.4	49.29	7	37.8	27	52.30	1	35.1	20	13.52	1	34.1	13	11.63	3	52.1	8
35.4	49.22		40.5		52.29		37.1		13.53		35.4		11.66		51.3	
Sec δ, Tan δ	1.346		−0.901		1.817		+1.517		1.002		−0.060		1.007		+0.119	
Mean Place	$45^{s}.405$		$47''.00$		$45^{s}.063$		$13''.81$		$9^{s}.096$		$48''.08$		$6^{s}.961$		$36''.96$	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	−0.02		+0.02		+0.04		−0.03		0.00		0.00		0.00		0.00	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	+0.1		+0.9		+0.1		+0.9		+0.1		+0.9		+0.1		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	9 Camelop. Mag. 4.4				ι Tauri. Mag. 5.1				π^5 Orionis. Mag. 3.9				ι Aurigæ. Mag. 2.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 4 45		° ′ +66 11		h m 4 46		° ′ +18 41		h m 4 49		° ′ + 2 17		h m 4 51		° ′ +33 1	
	s		″		s		″		s		″		s		″	
Jan. 0.4	26.00		62.7		18.07		43.0		44.23		63.5		20.75		57.0	
10.4	25.91	9	65.0	23	18.06	1	42.9	1	44.22	1	62.5	10	20.75	0	57.7	7
20.4	25.71	20	67.0	20	18.02	4	42.8	1	44.18	4	61.7	8	20.70	5	58.3	6
30.3	25.43	28	68.7	17	17.94	8	42.7	1	44.10	8	61.0	7	20.61	9	58.8	5
Feb. 9.3	25.08	35	69.9	12	17.82	12	42.6	1	43.98	12	60.4	6	20.47	14	59.1	3
19.3	24.67	41	70.6	7	17.67	15	42.4	2	43.84	14	60.0	4	20.30	17	59.3	2
Mar. 1.3	24.23	44	70.9	3	17.51	16	42.2	2	43.68	16	59.7	3	20.12	18	59.3	0
11.2	23.78	45	70.7	2	17.34	17	42.0	2	43.52	16	59.6	1	19.93	19	59.1	2
21.2	23.34	44	70.0	7	17.18	16	41.8	2	43.36	16	59.6	0	19.74	19	58.7	4
31.2	22.94	40	68.9	11	17.03	15	41.6	2	43.21	15	59.8	2	19.57	17	58.2	5
Apr. 10.1	22.60	34	67.4	15	16.91	12	41.4	2	43.08	13	60.2	4	19.42	15	57.5	7
20.1	22.34	26	65.5	19	16.82	9	41.3	1	42.99	9	60.7	5	19.31	11	56.8	7
30.1	22.16	18	63.4	21	16.76	6	41.2	1	42.93	6	61.4	7	19.25	6	56.1	7
May 10.1	22.08	8	61.2	22	16.75	1	41.2	0	42.91	2	62.2	8	19.24	1	55.4	7
20.0	22.10	2	58.9	23	16.79	4	41.3	1	42.94	3	63.2	10	19.28	4	54.7	7
30.0	22.23	13	56.6	23	16.88	9	41.5	2	43.01	7	64.4	12	19.37	9	54.0	7
June 9.0	22.46	23	54.4	22	17.01	13	41.9	4	43.12	11	65.7	13	19.51	14	53.5	5
19.0	22.79	33	52.3	21	17.19	18	42.4	5	43.28	16	67.1	14	19.70	19	53.2	3
28.9	23.20	41	50.5	18	17.40	21	43.0	6	43.47	19	68.6	15	19.93	23	53.0	2
July 8.9	23.69	49	48.9	16	17.64	24	43.7	7	43.69	22	70.1	15	20.20	27	52.9	1
18.9	24.24	55	47.6	13	17.91	27	44.5	8	43.94	25	71.6	15	20.50	30	52.9	0
28.8	24.85	61	46.6	10	18.21	30	45.3	8	44.21	27	73.0	14	20.82	32	53.1	2
Aug. 7.8	25.50	65	46.0	6	18.52	31	46.1	8	44.50	29	74.3	13	21.17	35	53.4	3
17.8	26.18	68	45.7	3	18.84	32	46.9	8	44.80	30	75.5	12	21.53	36	53.9	5
27.8	26.88	70	45.8	1	19.16	32	47.7	8	45.10	30	76.5	10	21.89	36	54.4	5
Sept. 6.7	27.58	70	46.2	4	19.48	32	48.4	7	45.40	30	77.2	7	22.25	36	55.0	6
16.7	28.27	69	47.0	8	19.80	32	49.0	6	45.70	30	77.7	5	22.61	36	55.6	6
26.7	28.95	68	48.1	11	20.11	31	49.5	5	45.99	29	77.9	2	22.96	35	56.3	7
Oct. 6.7	29.60	65	49.5	14	20.41	30	49.9	4	46.27	28	77.8	1	23.30	34	57.0	7
16.6	30.21	61	51.2	17	20.70	29	50.2	3	46.53	26	77.5	3	23.62	32	57.7	7
26.6	30.78	57	53.2	20	20.96	26	50.3	1	46.78	25	76.9	6	23.93	31	58.5	8
Nov. 5.6	31.29	51	55.5	23	21.20	24	50.4	1	47.01	23	76.1	8	24.21	28	59.2	7
15.5	31.73	44	57.9	24	21.42	22	50.4	0	47.21	20	75.1	10	24.46	25	60.0	8
25.5	32.09	36	60.4	25	21.61	19	50.3	1	47.38	17	74.1	10	24.67	21	60.7	7
Dec. 5.5	32.37	28	63.0	26	21.76	15	50.2	1	47.52	14	73.0	11	24.85	18	61.5	8
15.5	32.55	18	65.7	27	21.87	11	50.1	1	47.62	10	71.8	12	24.98	13	62.3	8
25.4	32.62	7	68.2	25	21.94	7	50.0	1	47.68	6	70.7	11	25.06	8	63.1	8
35.4	32.59	3	70.6	24	21.97	3	49.9	1	47.71	3	69.7	10	25.09	3	63.8	7
Sec δ, Tan δ	2.478		+2.267		1.056		+0.338		1.001		+0.040		1.193		+0.650	
Mean Place	23ˢ.645		46″.67		16ˢ.980		33″.44		43ˢ.132		56″.62		19ˢ.540		45″.36	
D′ψ α, Dω α	+0.06		−0.05		+0.01		−0.01		0.00		0.00		+0.02		−0.01	
Dψ δ, Dω δ	+0.1		+0.9		+0.1		+0.9		+0.1		+1.0		+0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Camelop. Mag. 4.2				ε Aurigæ. Var. 3.0–4.5				ζ Aurigæ. Mag. 3.9				ι Tauri. Mag. 4.7			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	4 55		+60 18		4 55		+43 41		4 56		+40 56		4 57		+21 27	
	s		″		s		″		s		″		s		″	
Jan. 0.4	42.39		73.9		44.81		57.0		24.99		72.2		54.81		69.0	
10.4	42.35	4	76.0	21	44.81	0	58.3	13	24.99	0	73.3	11	54.82	1	69.1	1
20.4	42.23	12	77.8	18	44.75	6	59.4	11	24.94	5	74.3	10	54.78	4	69.1	0
30.3	42.03	20	79.3	15	44.64	11	60.3	9	24.83	11	75.1	8	54.70	8	69.2	1
Feb. 9.3	41.76	27	80.5	12	44.48	16	61.0	7	24.68	15	75.7	6	54.59	11	69.2	0
19.3	41.45	31	81.3	8	44.28	20	61.4	4	24.50	18	76.1	4	54.45	14	69.1	1
Mar. 1.3	41.11	34	81.6	3	44.06	22	61.5	1	24.29	21	76.2	1	54.29	16	69.0	1
11.2	40.75	36	81.5	1	43.83	23	61.4	1	24.07	22	76.0	2	54.11	18	68.8	2
21.2	40.40	35	80.9	6	43.61	22	60.9	5	23.86	21	75.6	4	53.94	17	68.6	2
31.2	40.07	33	80.0	9	43.40	21	60.2	7	23.66	20	75.0	6	53.78	16	68.4	2
Apr. 10.2	39.79	28	78.7	13	43.22	18	59.3	9	23.49	17	74.2	8	53.65	13	68.1	3
20.1	39.57	22	77.1	16	43.09	13	58.3	10	23.36	13	73.2	10	53.55	10	67.9	2
30.1	39.42	15	75.3	18	43.01	8	57.1	12	23.28	8	72.1	11	53.49	6	67.7	2
May 10.1	39.35	7	73.3	20	42.98	3	55.8	13	23.26	2	71.0	11	53.47	2	67.5	2
20.0	39.37	2	71.2	21	43.01	3	54.5	13	23.29	3	69.9	11	53.50	3	67.4	1
30.0	39.47	10	69.2	20	43.10	9	53.3	12	23.38	9	68.8	11	53.58	8	67.5	1
June 9.0	39.66	19	67.2	20	43.25	15	52.2	11	23.52	14	67.8	10	53.70	12	67.7	2
19.0	39.93	27	65.4	18	43.46	21	51.2	10	23.72	20	67.0	8	53.87	17	67.9	2
28.9	40.27	34	63.7	17	43.71	25	50.4	8	23.97	25	66.3	7	54.08	21	68.3	4
July 8.9	40.67	40	62.3	14	44.01	30	49.7	7	24.26	29	65.8	5	54.32	24	68.8	5
18.9	41.12	45	61.1	12	44.35	34	49.2	5	24.58	32	65.5	3	54.59	27	69.4	6
28.9	41.62	50	60.2	9	44.72	37	49.0	2	24.93	35	65.3	2	54.88	29	70.0	6
Aug. 7.8	42.16	54	59.6	6	45.11	39	48.9	1	25.31	38	65.3	0	55.19	31	70.7	7
17.8	42.72	56	59.3	3	45.51	40	49.0	1	25.70	39	65.5	2	55.51	32	71.4	7
27.8	43.30	58	59.3	0	45.92	41	49.3	3	26.09	39	65.8	3	55.83	32	72.1	7
Sept. 6.7	43.88	58	59.6	3	46.34	42	49.8	5	26.49	40	66.3	5	56.16	33	72.7	6
16.7	44.46	58	60.3	7	46.75	41	50.4	6	26.89	40	66.9	6	56.49	33	73.2	5
26.7	45.03	57	61.2	9	47.15	40	51.2	8	27.28	39	67.6	7	56.81	32	73.6	4
Oct. 6.7	45.58	55	62.4	12	47.54	39	52.1	9	27.65	37	68.5	9	57.12	31	74.0	4
16.6	46.10	52	63.8	14	47.92	38	53.1	10	28.01	36	69.4	9	57.41	29	74.3	3
26.6	46.59	49	65.5	17	48.27	35	54.2	11	28.35	34	70.4	10	57.69	28	74.5	2
Nov. 5.6	47.04	45	67.4	19	48.59	32	55.4	12	28.66	31	71.5	11	57.95	26	74.6	1
15.6	47.43	39	69.5	21	48.88	29	56.7	13	28.94	28	72.6	11	58.18	23	74.7	1
25.5	47.76	33	71.7	22	49.13	25	58.1	14	29.18	24	73.8	12	58.38	20	74.7	0
Dec. 5.5	48.02	26	74.0	23	49.33	20	59.5	14	29.38	20	75.1	13	58.55	17	74.8	1
15.5	48.20	18	76.3	23	49.48	15	60.9	14	29.53	15	76.3	12	58.68	13	74.8	0
25.4	48.30	10	78.6	23	49.57	9	62.2	13	29.62	9	77.5	12	58.76	8	74.9	1
35.4	48.31	1	80.7	21	49.61	4	63.5	13	29.66	4	78.6	11	58.80	4	74.9	0
Sec δ, Tan δ	2.019		+1.755		1.383		+0.956		1.324		+0.868		1.075		+0.393	
Mean Place	40ˢ.373		58″.98		43ˢ.415		44″.02		23ˢ.644		59″.60		53ˢ.668		59″.21	
D′ψ α, Dω α	+0.05		−0.03		+0.02		−0.02		+0.02		−0.02		+0.01		−0.01	
Dψ δ, Dω δ	+0.1		+1.0		+0.1		+1.0		+0.1		+1.0		+0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**11 Orionis.** Mag. 4.6				**η Aurigæ.** Mag. 3.3				**ε Leporis.** Mag. 3.3				**β Eridani.** Mag. 2.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	4 59		+15 17		5 0		+41 7		5 1		−22 28		5 3		− 5 11	
	s		″		s		″		s		″		s		″	
Jan. 0.4	36.92	1	10.5	3	26.08	1	16.5	12	47.97	2	70.5	21	35.51	0	47.3	14
10.4	36.93	3	10.2	3	26.09	5	17.7	10	47.95	7	72.6	18	35.51	4	48.7	12
20.4	36.90	8	9.9	2	26.04	10	18.7	8	47.88	11	74.4	15	35.47	8	49.9	10
30.3	36.82	11	9.7	2	25.94	15	19.5	6	47.77	14	75.9	12	35.39	11	50.9	8
Feb. 9.3	36.71	14	9.5	2	25.79	19	20.1	4	47.63	17	77.1	8	35.28	14	51.7	6
19.3	36.57	15	9.3	2	25.60	21	20.5	1	47.46	19	77.9	5	35.14	16	52.3	3
Mar. 1.3	36.42	17	9.1	1	25.39	21	20.6	1	47.27	20	78.4	1	34.98	17	52.6	2
11.2	36.25	17	9.0	1	25.18	22	20.5	4	47.07	20	78.5	3	34.81	17	52.8	1
21.2	36.08	15	8.9	1	24.96	20	20.1	6	46.87	18	78.2	7	34.64	16	52.7	3
31.2	35.93	13	8.8	1	24.76	17	19.5	8	46.69	16	77.5	10	34.48	14	52.4	6
Apr. 10.2	35.80	10	8.7	0	24.59	13	18.7	10	46.53	13	76.5	13	34.34	11	51.8	8
20.1	35.70	6	8.7	1	24.46	9	17.7	10	46.40	10	75.2	16	34.23	7	51.0	10
30.1	35.64	2	8.8	2	24.37	3	16.7	11	46.30	6	73.6	19	34.16	4	50.0	11
May 10.1	35.62	3	9.0	3	24.34	3	15.6	11	46.24	1	71.7	22	34.12	1	48.9	14
20.0	35.65	7	9.3	4	24.37	9	14.5	11	46.23	4	69.5	24	34.13	5	47.5	15
30.0	35.72	11	9.7	5	24.46	14	13.4	10	46.27	8	67.1	25	34.18	10	46.0	17
June 9.0	35.83	16	10.2	6	24.60	20	12.4	9	46.35	12	64.6	25	34.28	13	44.3	17
19.0	35.99	20	10.8	7	24.80	24	11.5	7	46.47	17	62.1	26	34.41	17	42.6	18
28.9	36.19	23	11.5	8	25.04	28	10.8	6	46.64	20	59.5	26	34.58	21	40.8	18
July 8.9	36.42	25	12.3	9	25.32	32	10.2	4	46.84	23	56.9	24	34.79	23	39.0	18
18.9	36.67	28	13.2	9	25.64	35	9.8	2	47.07	25	54.5	22	35.02	26	37.2	17
28.9	36.95	30	14.1	8	25.99	38	9.6	0	47.32	28	52.3	19	35.28	28	35.5	15
Aug. 7.8	37.25	31	14.9	8	26.37	39	9.6	1	47.60	30	50.4	16	35.56	29	34.0	13
17.8	37.56	31	15.7	8	26.76	39	9.7	3	47.90	30	48.8	12	35.85	29	32.7	10
27.8	37.87	32	16.5	6	27.15	40	10.0	4	48.20	31	47.6	8	36.14	30	31.7	7
Sept. 6.7	38.19	31	17.1	5	27.55	40	10.4	6	48.51	30	46.8	3	36.44	30	31.0	4
16.7	38.50	31	17.6	4	27.95	39	11.0	7	48.81	30	46.5	2	36.74	29	30.6	1
26.7	38.81	30	18.0	2	28.34	38	11.7	8	49.11	29	46.7	6	37.03	28	30.5	3
Oct. 6.7	39.11	29	18.2	1	28.72	36	12.5	8	49.40	27	47.3	11	37.31	27	30.8	6
16.6	39.40	27	18.3	1	29.08	34	13.3	10	49.67	26	48.4	15	37.58	25	31.4	9
26.6	39.67	25	18.2	2	29.42	32	14.3	11	49.93	23	49.9	19	37.83	23	32.3	12
Nov. 5.6	39.92	22	18.0	2	29.74	29	15.4	11	50.16	20	51.8	22	38.06	21	33.5	14
15.6	40.14	20	17.8	3	30.03	24	16.5	12	50.36	16	54.0	24	38.27	18	34.9	15
25.5	40.34	16	17.5	4	30.27	20	17.7	12	50.52	13	56.4	24	38.45	14	36.4	16
Dec. 5.5	40.50	12	17.1	4	30.47	15	18.9	12	50.65	9	58.8	25	38.59	11	38.0	16
15.5	40.62	8	16.7	3	30.62	10	20.1	12	50.74	5	61.3	24	38.70	7	39.6	15
25.4	40.70	4	16.4	4	30.72	5	21.3	12	50.79	0	63.7	22	38.77	3	41.1	15
35.4	40.74		16.0		30.77		22.5		50.79		65.9		38.80		42.6	
Sec δ, Tan δ	1.037		+0.273		1.327		+0.873		1.082		−0.414		1.004		−0.091	
Mean Place	35ˢ.797		1″.59		24ˢ.709		4″.04		46ˢ.658		74″.10		34ˢ.351		53″.24	
D′ψ α, Dω α	+0.01		0.00		+0.02		−0.02		−0.01		+0.01		0.00		0.00	
Dψ δ, Dω δ	+0.1		+1.0		+0.1		+1.0		+0.1		+1.0		+0.1		+1.0	

Mean Solar Date.	μ Aurigæ. Mag. 4.8				19 H. Camelop. Mag. 5.2				μ Leporis. Mag. 3.3				α Aurigæ. Mag. 0.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	5 7		+38 22		5 8		+79 7		5 9		−16 18		5 10		+45 54	
	s		″		s		″		s		″		s		″	
Jan. 0.4	29.69		68.5		17.52		76.2		2.64		23.4		17.12		50.8	
10.4	29.71	2	69.5	10	17.31	21	79.1	29	2.63	1	25.3	19	17.14	2	52.2	14
20.4	29.67	4	70.4	9	16.88	43	81.7	26	2.58	5	26.9	16	17.09	5	53.4	12
30.4	29.58	9	71.1	7	16.26	62	83.9	22	2.49	9	28.3	14	16.98	11	54.5	11
Feb. 9.3	29.44	14	71.7	6	15.47	79	85.7	18	2.36	13	29.4	11	16.82	16	55.3	8
19.3	29.27	17	72.1	4	14.56	91	87.0	13	2.20	16	30.2	8	16.63	19	55.9	6
Mar. 1.3	29.07	20	72.3	2	13.56	100	87.7	7	2.03	17	30.7	5	16.41	22	56.2	3
11.2	28.86	21	72.2	1	12.52	104	87.9	2	1.85	18	30.9	2	16.17	24	56.1	1
21.2	28.66	20	71.9	3	11.49	103	87.5	4	1.66	19	30.7	2	15.93	24	55.8	3
31.2	28.47	19	71.4	5	10.53	96	86.5	10	1.48	18	30.2	5	15.71	22	55.2	6
Apr. 10.2	28.30	17	70.7	7	9.67	86	85.0	15	1.33	15	29.4	8	15.51	20	54.3	9
20.1	28.17	13	69.9	8	8.95	72	83.1	19	1.21	12	28.3	11	15.35	16	53.3	10
30.1	28.08	9	69.0	9	8.40	55	80.9	22	1.12	9	26.9	14	15.25	10	52.1	12
May 10.1	28.04	4	68.0	10	8.04	36	78.4	25	1.07	5	25.2	17	15.20	5	50.8	13
20.1	28.06	2	67.0	10	7.89	15	75.7	27	1.06	1	23.3	19	15.21	1	49.4	14
30.0	28.14	8	66.1	9	7.95	6	72.9	28	1.09	3	21.3	20	15.29	8	48.0	14
June 9.0	28.27	13	65.2	9	8.22	27	70.1	28	1.17	8	19.1	22	15.43	14	46.7	13
19.0	28.45	18	64.4	8	8.70	48	67.5	26	1.29	12	16.8	23	15.62	19	45.5	12
28.9	28.68	23	63.8	6	9.37	67	65.0	25	1.45	16	14.5	23	15.87	25	44.5	10
July. 8.9	28.95	27	63.3	5	10.22	85	62.7	23	1.65	20	12.2	23	16.16	29	43.6	9
18.9	29.26	31	63.0	3	11.22	100	60.7	20	1.88	23	10.0	22	16.49	33	42.9	7
28.9	29.59	33	62.9	1	12.36	114	59.1	16	2.13	25	8.0	20	16.86	37	42.4	5
Aug. 7.8	29.95	36	62.9	0	13.61	125	57.8	13	2.40	27	6.2	18	17.25	39	42.0	4
17.8	30.32	37	63.0	1	14.94	133	56.9	9	2.69	29	4.7	15	17.66	41	41.9	1
27.8	30.70	38	63.2	2	16.33	139	56.4	5	2.98	29	3.5	12	18.08	42	42.0	1
Sept. 6.8	31.08	38	63.6	4	17.75	142	56.4	0	3.28	30	2.7	8	18.51	43	42.3	3
16.7	31.47	39	64.1	5	19.18	143	56.8	4	3.58	30	2.3	4	18.94	43	42.7	4
26.7	31.85	38	64.7	6	20.60	142	57.6	8	3.87	29	2.4	1	19.37	43	43.3	6
Oct. 6.7	32.22	37	65.3	6	21.98	138	58.8	12	4.16	29	2.9	5	19.78	41	44.0	7
16.6	32.57	35	66.0	7	23.29	131	60.4	16	4.43	27	3.9	10	20.18	40	44.9	9
26.6	32.91	34	66.8	8	24.51	122	62.4	20	4.69	26	5.2	13	20.56	38	45.9	10
Nov. 5.6	33.22	31	67.7	9	25.61	110	64.7	23	4.93	24	6.8	16	20.91	35	47.1	12
15.6	33.50	28	68.6	9	26.57	96	67.3	26	5.14	21	8.7	19	21.22	31	48.4	13
25.5	33.74	24	69.6	10	27.35	78	70.2	29	5.32	18	10.8	21	21.49	27	49.8	14
Dec. 5.5	33.95	21	70.6	10	27.94	59	73.2	30	5.46	14	13.0	22	21.72	23	51.2	14
15.5	34.11	16	71.7	11	28.32	38	76.3	31	5.56	10	15.2	22	21.90	18	52.7	15
25.5	34.22	11	72.7	10	28.48	16	79.4	31	5.62	6	17.3	21	22.01	11	54.1	14
35.4	34.27	5	73.7	10	28.41	7	82.4	30	5.64	2	19.4	21	22.06	5	55.5	14
Sec δ, Tan δ	1.276		+0.792		5.306		+5.211		1.042		−0.293		1.437		+1.032	
Mean Place	$28^{s}.334$		56″.65		$11^{s}.849$		60″.75		$1^{s}.385$		28″.01		$15^{s}.591$		38″.17	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	+0.02		−0.01		+0.13		−0.08		−0.01		0.00		+0.03		−0.01	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	+0.1		+1.0		+0.1		+1.0		+0.1		+1.0		+0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*β* **Orionis.** Mag. 0.3				*λ* **Aurigæ.** Mag. 4.8				*τ* **Orionis.** Mag. 3.7				*o* **Columbæ.** Mag. 4.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	5 10		− 8 17		5 13		+40 1		5 13		− 6 55		5 14		−34 58	
	s		″		s		″		s		″		s		″	
Jan. 0.4	22.56		59.4		2.57		33.8		24.09		69.7		22.21		44.9	
10.4	22.56	0	60.9	15	2.59	2	34.9	11	24.10	1	71.2	15	22.17	4	47.5	26
20.4	22.52	4	62.3	14	2.55	4	35.9	10	24.06	4	72.5	13	22.08	9	49.8	23
30.4	22.44	8	63.4	11	2.46	9	36.7	8	23.98	8	73.6	11	21.94	14	51.7	19
Feb. 9.3	22.32	12	64.3	9	2.33	13	37.3	6	23.87	11	74.5	9	21.77	17	53.2	15
19.3	22.18	14	65.0	7	2.16	17	37.8	5	23.73	14	75.2	7	21.56	21	54.3	11
Mar. 1.3	22.02	16	65.4	4	1.96	20	38.0	2	23.57	16	75.6	4	21.33	23	54.9	6
11.2	21.84	18	65.5	1	1.75	21	38.0	0	23.40	17	75.7	1	21.09	24	55.1	2
21.2	21.67	17	65.4	1	1.53	22	37.7	3	23.23	17	75.6	1	20.86	23	54.8	3
31.2	21.51	16	65.1	3	1.33	20	37.2	5	23.07	16	75.3	3	20.63	23	54.1	7
Apr. 10.2	21.37	14	64.5	6	1.16	17	36.5	7	22.93	14	74.8	5	20.42	21	52.9	12
20.1	21.25	12	63.7	8	1.02	14	35.6	9	22.81	12	74.0	8	20.24	18	51.3	16
30.1	21.17	8	62.6	11	0.93	9	34.6	10	22.72	9	73.0	10	20.10	14	49.4	19
May 10.1	21.13	4	61.3	13	0.89	4	33.5	11	22.68	4	71.8	12	20.01	9	47.2	22
20.1	21.13	0	59.8	15	0.90	1	32.4	11	22.68	0	70.3	15	19.96	5	44.7	25
30.0	21.17	4	58.1	17	0.97	7	31.4	10	22.72	4	68.7	16	19.96	0	41.9	28
June 9.0	21.25	8	56.3	18	1.10	13	30.4	10	22.80	8	67.0	17	20.01	5	39.0	29
19.0	21.38	13	54.4	19	1.28	18	29.5	9	22.93	13	65.2	18	20.11	10	36.0	30
28.9	21.54	16	52.5	19	1.51	23	28.8	7	23.09	16	63.3	19	20.25	14	33.0	30
July 8.9	21.74	20	50.5	20	1.78	27	28.2	6	23.29	20	61.5	18	20.44	19	30.1	29
18.9	21.97	23	48.6	19	2.09	31	27.7	5	23.51	22	59.7	18	20.67	23	27.3	28
28.9	22.22	25	46.9	17	2.42	33	27.4	3	23.76	25	58.0	17	20.93	26	24.8	25
Aug. 7.8	22.49	27	45.3	16	2.78	36	27.3	1	24.03	27	56.4	16	21.21	28	22.6	22
17.8	22.78	29	43.9	14	3.16	38	27.3	0	24.32	29	55.1	13	21.51	30	20.8	18
27.8	23.07	29	42.8	11	3.55	39	27.4	1	24.61	29	54.0	11	21.83	32	19.4	14
Sept. 6.8	23.37	30	42.1	7	3.94	39	27.7	3	24.91	30	53.3	7	22.16	33	18.6	8
16.7	23.67	30	41.7	4	4.34	40	28.1	4	25.21	30	52.9	4	22.49	33	18.3	3
26.7	23.96	29	41.7	0	4.73	39	28.6	5	25.50	29	52.9	0	22.81	32	18.6	3
Oct. 6.7	24.24	28	42.1	4	5.11	38	29.2	6	25.78	28	53.2	3	23.13	32	19.4	8
16.6	24.51	27	42.8	7	5.48	37	29.9	7	26.06	28	53.8	6	23.43	30	20.7	13
26.6	24.77	26	43.8	10	5.83	35	30.7	8	26.32	26	54.8	10	23.71	28	22.5	18
Nov. 5.6	25.01	24	45.1	13	6.15	32	31.6	9	26.56	24	56.1	13	23.96	25	24.8	23
15.6	25.22	21	46.6	15	6.45	30	32.6	10	26.77	21	57.6	15	24.17	21	27.4	26
25.5	25.40	18	48.3	17	6.71	26	33.6	10	26.96	19	59.2	16	24.35	18	30.3	29
Dec. 5.5	25.55	15	50.1	18	6.92	21	34.7	11	27.11	15	60.9	17	24.49	14	33.3	30
15.5	25.66	11	51.9	18	7.09	17	35.8	11	27.23	12	62.6	17	24.58	9	36.3	30
25.5	25.73	7	53.7	18	7.20	11	36.9	11	27.31	8	64.3	17	24.61	3	39.2	29
35.4	25.77	4	55.4	17	7.26	6	38.0	11	27.34	3	65.9	16	24.60	1	42.0	28
Sec δ, Tan δ	1.011		−0.146		1.306		+0.840		1.007		−0.122		1.220		−0.700	
Mean Place	$21^s.362$		$65''.04$		$1^s.150$		$21''.98$		$22^s.901$		$75''.62$		$20^s.657$		$47''.79$	
$D'_\psi \alpha$, $D_\omega \alpha$	0.00		0.00		+0.02		−0.01		0.00		0.00		−0.02		+0.01	
$D_\psi \delta$, $D_\omega \delta$	+0.1		+1.0		+0.1		+1.0		+0.1		+1.0		+0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Orionis. Mag. 1.7				β Tauri. Mag. 1.8				17 Camelop. Mag. 5.8				β Leporis. Mag. 3.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	5 20		+ 6 16		5 20		+28 32		5 21		+62 59		5 24		−20 49	
	s		″		s		″		s		″		s		″	
Jan. 0.4	29.01		25.5		48.75		15.8		59.46		58.5		32.38		36.5	
10.4	29.04	3	24.7	8	48.78	3	16.3	5	59.46	0	60.8	23	32.38	0	38.6	21
20.4	29.02	2	24.0	7	48.76	2	16.7	4	59.36	10	62.9	21	32.33	5	40.5	19
30.4	28.96	6	23.4	6	48.70	6	17.1	4	59.18	18	64.8	19	32.24	9	42.2	17
Feb. 9.3	28.86	10	22.9	5	48.59	11	17.4	3	58.92	26	66.3	15	32.12	12	43.5	13
19.3	28.73	13	22.5	4	48.44	15	17.6	2	58.60	32	67.4	11	31.96	16	44.4	9
Mar. 1.3	28.58	15	22.2	3	48.27	17	17.6	0	58.23	37	68.1	7	31.78	18	45.0	6
11.3	28.41	17	22.1	1	48.09	18	17.6	0	57.84	39	68.3	2	31.59	19	45.3	3
21.2	28.24	17	22.1	0	47.91	18	17.5	1	57.44	40	68.0	3	31.39	20	45.2	1
31.2	28.09	15	22.1	0	47.74	17	17.2	3	57.06	38	67.3	7	31.20	19	44.7	5
Apr. 10.2	27.95	14	22.3	2	47.59	15	16.8	4	56.73	33	66.2	11	31.03	17	43.9	8
20.1	27.84	11	22.6	3	47.46	13	16.4	4	56.45	28	64.7	15	30.89	14	42.8	11
30.1	27.76	8	23.1	5	47.37	9	15.9	5	56.24	21	63.0	17	30.78	11	41.4	14
May 10.1	27.72	4	23.7	6	47.33	4	15.4	5	56.11	13	61.1	19	30.71	7	39.7	17
20.1	27.72	0	24.4	7	47.34	1	14.9	5	56.07	4	59.0	21	30.68	3	37.7	20
30.0	27.77	5	25.3	9	47.40	6	14.5	4	56.13	6	56.8	22	30.69	1	35.5	22
June 9.0	27.86	9	26.3	10	47.51	11	14.2	3	56.27	14	54.6	22	30.75	6	33.1	24
19.0	27.99	13	27.4	11	47.66	15	14.0	2	56.50	23	52.5	21	30.85	10	30.7	24
29.0	28.16	17	28.5	11	47.86	20	13.9	1	56.81	31	50.6	19	31.00	15	28.2	25
July 8.9	28.36	20	29.7	12	48.09	23	13.9	0	57.20	39	48.8	18	31.18	18	25.8	24
18.9	28.59	23	30.9	12	48.36	27	14.0	1	57.65	45	47.2	16	31.39	21	23.4	24
28.9	28.84	25	32.1	12	48.65	29	14.1	1	58.16	51	45.9	13	31.63	24	21.2	22
Aug. 7.8	29.11	27	33.2	11	48.96	31	14.3	2	58.71	55	44.9	10	31.89	26	19.3	19
17.8	29.40	29	34.1	9	49.29	33	14.6	3	59.30	59	44.2	7	32.17	28	17.7	16
27.8	29.70	30	34.9	8	49.63	34	15.0	4	59.91	61	43.8	4	32.47	30	16.4	13
Sept. 6.8	30.00	30	35.5	6	49.98	35	15.3	3	60.54	63	43.7	1	32.77	30	15.6	8
16.7	30.31	31	35.9	4	50.33	35	15.7	4	61.17	63	43.9	2	33.07	30	15.2	4
26.7	30.61	30	36.1	2	50.67	34	16.0	3	61.80	63	44.5	6	33.37	30	15.3	1
Oct. 6.7	30.90	29	36.0	1	51.00	33	16.3	3	62.42	62	45.4	9	33.67	30	15.8	5
16.7	31.19	29	35.7	3	51.33	33	16.6	3	63.01	59	46.5	11	33.95	28	16.8	10
26.6	31.46	27	35.2	5	51.64	31	17.0	4	63.57	56	47.9	14	34.22	27	18.3	15
Nov. 5.6	31.71	25	34.5	7	51.93	29	17.3	3	64.09	52	49.6	17	34.47	25	20.1	18
15.6	31.94	23	33.6	9	52.20	27	17.6	3	64.56	47	51.5	19	34.69	22	22.2	21
25.5	32.15	21	32.7	9	52.44	24	17.9	3	64.97	41	53.6	21	34.88	19	24.5	23
Dec. 5.5	32.32	17	31.7	10	52.64	20	18.3	4	65.30	33	55.9	23	35.04	16	26.9	24
15.5	32.46	14	30.7	10	52.80	16	18.7	4	65.55	25	58.2	23	35.15	11	29.4	25
25.5	32.55	9	29.7	10	52.91	11	19.1	4	65.71	16	60.6	24	35.22	7	31.8	24
35.4	32.60	5	28.8	9	52.98	7	19.5	4	65.77	6	63.0	24	35.25	3	34.1	23
Sec δ, Tan δ	1.006		+0.110		1.138		+0.544		2.203		+1.962		1.070		−0.380	
Mean Place	27ˢ.843		17″.91		47ˢ.470		5″.62		57ˢ.004		45″.05		31ˢ.059		41″.16	
D'_ψ *a*, D_ω *a*	0.00		0.00		+0.01		−0.01		+0.05		−0.02		−0.01		0.00	
D_ψ δ, D_ω δ	+0.1		+1.0		+0.1		+1.0		+0.1		+1.0		+0.1		+1.0	

Mean Solar Date.	χ Aurigæ. Mag. 4.9				δ Orionis. Mag. 2.5				Groombridge 966. Mag. 6.4				α Leporis. Mag. 2.7			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 5 27		° ′ +32 7		h m 5 27		° ′ − 0 21		h m 5 28		° ′ +74 59		h m 5 28		° ′ −17 52	
	s		″		s		″		s		″		s		″	
Jan. 0.4	5.20	4	53.3	7	34.87	3	39.1	12	9.47	5	31.1	28	54.87	1	56.9	21
10.4	5.24	2	54.0	6	34.90	2	40.3	11	9.42	22	33.9	26	54.88	4	59.0	18
20.4	5.22	6	54.6	5	34.88	6	41.4	9	9.20	37	36.5	23	54.84	8	60.8	16
30.4	5.16	11	55.1	5	34.82	10	42.3	7	8.83	50	38.8	19	54.76	12	62.4	13
Feb. 9.3	5.05	15	55.6	4	34.72	13	43.0	5	8.33	61	40.7	14	54.64	15	63.7	9
19.3	4.90	17	56.0	2	34.59	15	43.5	4	7.72	69	42.1	9	54.49	18	64.6	6
Mar. 1.3	4.73	19	56.2	0	34.44	17	43.9	2	7.03	73	43.0	4	54.31	19	65.2	3
11.3	4.54	19	56.2	2	34.27	17	44.1	0	6.30	73	43.4	2	54.12	19	65.5	1
21.2	4.35	18	56.0	3	34.10	16	44.1	2	5.57	70	43.2	7	53.93	18	65.4	4
31.2	4.17	17	55.7	4	33.94	14	43.9	4	4.87	64	42.5	12	53.75	16	65.0	7
Apr. 10.2	4.00	13	55.3	5	33.80	12	43.5	5	4.23	55	41.3	16	53.59	14	64.3	10
20.1	3.87	9	54.8	6	33.68	9	43.0	7	3.68	44	39.7	20	53.45	11	63.3	14
30.1	3.78	5	54.2	6	33.59	5	42.3	9	3.24	30	37.7	23	53.34	7	61.9	16
May 10.1	3.73	0	53.6	6	33.54	1	41.4	10	2.94	15	35.4	25	53.27	3	60.3	18
20.1	3.73	6	53.0	6	33.53	4	40.4	12	2.79	0	32.9	26	53.24	2	58.5	20
30.0	3.79	10	52.4	6	33.57	8	39.2	13	2.79	16	30.3	27	53.26	6	56.5	22
June 9.0	3.89	15	51.8	5	33.65	12	37.9	15	2.95	31	27.6	26	53.32	10	54.3	23
19.0	4.04	19	51.3	4	33.77	15	36.4	15	3.26	46	25.0	25	53.42	14	52.0	24
29.0	4.23	24	50.9	2	33.92	19	34.9	15	3.72	58	22.5	23	53.56	17	49.6	23
July 8.9	4.47	27	50.7	1	34.11	22	33.4	15	4.30	71	20.2	20	53.73	21	47.3	22
18.9	4.74	29	50.6	1	34.33	25	31.9	14	5.01	81	18.2	18	53.94	24	45.1	21
28.9	5.03	32	50.5	1	34.58	26	30.5	13	5.82	89	16.4	15	54.18	26	43.0	19
Aug. 7.8	5.35	34	50.6	1	34.84	28	29.2	11	6.71	96	14.9	11	54.44	28	41.1	16
17.8	5.69	35	50.7	2	35.12	29	28.1	9	7.67	102	13.8	7	54.72	29	39.5	12
27.8	6.04	36	50.9	3	35.41	30	27.2	7	8.69	105	13.1	3	55.01	30	38.3	8
Sept. 6.8	6.40	36	51.2	3	35.71	30	26.5	4	9.74	107	12.8	1	55.31	30	37.5	4
16.7	6.76	36	51.5	3	36.01	29	26.1	0	10.81	106	12.9	4	55.61	30	37.1	0
26.7	7.12	35	51.8	3	36.30	29	26.1	2	11.87	105	13.3	9	55.91	29	37.1	5
Oct. 6.7	7.47	34	52.1	4	36.59	29	26.3	5	12.92	101	14.2	13	56.20	28	37.6	9
16.7	7.81	33	52.5	4	36.88	27	26.8	8	13.93	95	15.5	16	56.48	27	38.5	13
26.6	8.14	31	52.9	4	37.15	25	27.6	10	14.88	87	17.1	20	56.75	25	39.8	17
Nov. 5.6	8.45	28	53.3	4	37.40	23	28.6	12	15.75	78	19.1	23	57.00	23	41.5	20
15.6	8.73	25	53.7	5	37.63	21	29.8	13	16.53	67	21.4	25	57.23	20	43.5	22
25.5	8.98	21	54.2	6	37.84	17	31.1	14	17.20	53	23.9	27	57.43	16	45.7	23
Dec. 5.5	9.19	17	54.8	6	38.01	13	32.5	14	17.73	38	26.6	29	57.59	12	48.0	23
15.5	9.36	13	55.4	6	38.14	10	33.9	13	18.11	22	29.5	29	57.71	8	50.3	23
25.5	9.49	7	56.0	7	38.24	5	35.2	13	18.33	5	32.4	28	57.79	3	52.6	22
35.4	9.56		56.7		38.29		36.5		18.38		35.2		57.82		54.8	
Sec δ, Tan δ	1.181		+0.628		1.000		−0.006		3.861		+3.730		+1.051		−0.323	
Mean Place	$3^{s}.855$		$42''.94$		$33^{s}.680$		$45''.96$		$5^{s}.029$		$17''.32$		$53^{s}.574$		$62''.07$	
$D'_{\psi}\,a$, $D_{\omega}\,a$	+0.02		−0.01		0.00		0.00		+0.10		−0.03		−0.01		0.00	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	+0.1		+1.0		+0.1		+1.0		+0.1		+1.0		+0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ϕ^1 Orionis. Mag. 4.5				ι Orionis. Mag. 2.9				• ε Orionis. Mag. 1.8				ζ Tauri. Mag. 3.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	5 30		+ 9 25		5 31		− 5 57		5 31		− 1 15		5 32		+21 5	
	s		″		s		″		s		″		s		″	
Jan. 0.5	3.80	3	60.9	6	11.84	2	52.4	15	49.10	3	17.2	13	27.92	5	34.0	0
10.4	3.83	1	60.3	6	11.86	2	53.9	13	49.13	2	18.5	11	27.97	0	34.0	1
20.4	3.82	5	59.7	5	11.84	6	55.2	11	49.11	6	19.6	9	27.97	5	34.1	0
30.4	3.77	9	59.2	4	11.78	10	56.3	9	49.05	10	20.5	8	27.92	10	34.1	1
Feb. 9.3	3.68	13	58.8	3	11.68	13	57.2	7	48.95	12	21.3	6	27.82	13	34.2	0
19.3	3.55	15	58.5	2	11.55	16	57.9	5	48.83	15	21.9	4	27.69	15	34.2	0
Mar. 1.3	3.40	16	58.3	1	11.39	17	58.4	2	48.68	17	22.3	2	27.54	17	34.2	0
11.3	3.24	17	58.2	1	11.22	17	58.6	0	48.51	17	22.5	0	27.37	18	34.2	1
21.2	3.07	16	58.1	1	11.05	17	58.6	2	48.34	16	22.5	2	27.19	17	34.1	1
31.2	2.91	14	58.2	1	10.88	15	58.4	5	48.18	15	22.3	4	27.02	15	34.0	2
Apr. 10.2	2.77	12	58.3	2	10.73	12	57.9	7	48.03	12	21.9	5	26.87	12	33.8	1
20.2	2.65	8	58.5	3	10.61	10	57.2	9	47.91	9	21.4	7	26.75	8	33.7	1
30.1	2.57	5	58.8	4	10.51	6	56.3	11	47.82	5	20.7	9	26.67	5	33.6	1
May 10.1	2.52	0	59.2	6	10.45	1	55.2	13	47.77	1	19.8	11	26.62	0	33.5	1
20.1	2.52	4	59.8	7	10.44	3	53.9	15	47.76	3	18.7	13	26.62	4	33.4	0
30.0	2.56	8	60.5	8	10.47	7	52.4	16	47.79	7	17.4	14	26.66	9	33.4	1
June 9.0	2.64	13	61.3	8	10.54	11	50.8	17	47.86	11	16.0	14	26.75	13	33.5	2
19.0	2.77	16	62.1	9	10.65	15	49.1	17	47.97	15	14.6	15	26.88	18	33.7	3
29.0	2.93	20	63.0	10	10.80	18	47.4	18	48.12	19	13.1	16	27.06	21	34.0	3
July 8.9	3.13	23	64.0	10	10.98	21	45.6	18	48.31	22	11.5	15	27.27	24	34.3	4
18.9	3.36	25	65.0	10	11.19	24	43.8	16	48.53	24	10.0	14	27.51	27	34.7	4
28.9	3.61	27	66.0	9	11.43	26	42.2	15	48.77	26	8.6	13	27.78	29	35.1	4
Aug. 7.9	3.88	29	66.9	9	11.69	27	40.7	13	49.03	28	7.3	12	28.07	30	35.5	5
17.8	4.17	30	67.8	7	11.96	29	39.4	10	49.31	29	6.1	9	28.37	32	36.0	4
27.8	4.47	30	68.5	5	12.25	29	38.4	7	49.60	29	5.2	7	28.69	32	36.4	4
Sept. 6.8	4.77	31	69.0	4	12.54	30	37.7	4	49.89	30	4.5	4	29.01	33	36.8	3
16.7	5.08	30	69.4	1	12.84	29	37.3	1	50.19	30	4.1	1	29.34	32	37.1	2
26.7	5.38	30	69.5	1	13.13	29	37.2	3	50.49	29	4.0	3	29.66	32	37.3	1
Oct. 6.7	5.68	29	69.4	2	13.42	29	37.5	7	50.78	28	4.3	5	29.98	32	37.4	0
16.7	5.97	28	69.2	4	13.71	27	38.2	10	51.06	27	4.8	8	30.30	30	37.4	0
26.6	6.25	27	68.8	6	13.98	25	39.2	12	51.33	26	5.6	11	30.60	28	37.4	1
Nov. 5.6	6.52	24	68.2	8	14.23	23	40.4	15	51.59	24	6.7	13	30.88	26	37.3	2
15.6	6.76	22	67.4	8	14.46	21	41.9	16	51.83	21	8.0	14	31.14	24	37.1	2
25.6	6.98	18	66.6	8	14.67	17	43.5	17	52.04	17	9.4	14	31.38	20	36.9	1
Dec. 5.5	7.16	15	65.8	8	14.84	13	45.2	18	52.21	14	10.8	15	31.58	16	36.8	1
15.5	7.31	11	65.0	8	14.97	9	47.0	17	52.35	10	12.3	14	31.74	12	36.7	1
25.5	7.42	6	64.2	8	15.06	6	48.7	16	52.45	5	13.7	14	31.86	8	36.6	1
35.4	7.48		63.4		15.12		50.3		52.50		15.1		31.94		36.5	
Sec δ, Tan δ	1.014		+0.166		1.005		−0.104		1.000		−0.022		1.072		+0.386	
Mean Place	2ˢ.608		52″.99		10ˢ.622		58″.68		47ˢ.901		24″.02		26ˢ.680		24″.95	
D′ψ α, Dω α	0.00		0.00		0.00		0.00		0.00		0.00		+0.01		0.00	
Dψ δ, Dω δ	0.0		+1.0		0.0		+1.0		0.0		+1.0		0.0		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Orionis. Mag. 2.0				· α Columbæ. Mag. 2.8				ο Aurigæ. Mag. 5.5				ζ Leporis. Mag. 3.7			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 5 36		° ′ − 1 58		h m 5 36		° ′ −34 6		h m 5 39		° ′ +49 47		h m 5 43		° ′ −14 50	
	s		″		s		″		s		″		s		″	
Jan. 0.5	23.33		69.9		31.47		67.8		11.34		32.6		2.06		67.4	
10.4	23.36	3	71.2	13	31.45	2	70.5	27	11.39	5	34.3	17	2.08	2	69.4	20
20.4	23.35	1	72.3	11	31.38	7	72.9	24	11.37	2	35.9	16	2.06	2	71.2	18
30.4	23.30	5	73.3	10	31.26	12	75.0	21	11.29	8	37.3	14	1.99	7	72.7	15
Feb. 9.3	23.20	10	74.1	8	31.10	16	76.7	17	11.14	15	38.5	12	1.89	10	73.9	12
19.3	23.07	13	74.7	6	30.91	19	78.0	13	10.94	20	39.4	9	1.75	14	74.9	10
Mar. 1.3	22.92	15	75.2	5	30.69	22	78.9	9	10.70	24	40.0	6	1.58	17	75.6	7
11.3	22.75	17	75.4	2	30.46	23	79.3	4	10.45	25	40.3	3	1.40	18	76.0	4
21.2	22.58	17	75.4	0	30.22	24	79.2	1	10.19	26	40.2	1	1.22	18	76.0	0
31.2	22.42	16	75.2	2	29.99	23	78.7	5	9.93	26	39.8	4	1.04	18	75.7	3
Apr. 10.2	22.27	15	74.9	3	29.78	21	77.8	9	9.70	23	39.1	7	0.87	17	75.1	6
20.2	22.15	12	74.3	6	29.59	19	76.4	14	9.51	19	38.2	9	0.73	14	74.2	9
30.1	22.06	9	73.5	8	29.44	15	74.7	17	9.36	15	37.0	12	0.62	11	73.1	11
May 10.1	22.00	6	72.6	9	29.33	11	72.6	21	9.27	9	35.6	14	0.55	7	71.7	14
20.1	21.98	2	71.5	11	29.26	7	70.3	23	9.24	3	34.1	15	0.51	4	70.1	16
30.0	22.01	3	70.3	12	29.24	2	67.7	26	9.28	4	32.6	15	0.51	0	68.2	19
June 9.0	22.08	7	68.9	14	29.27	3	64.9	28	9.38	10	31.1	15	0.56	5	66.2	20
19.0	22.19	11	67.4	15	29.34	7	62.0	29	9.54	16	29.6	15	0.65	9	64.1	21
29.0	22.33	14	65.9	15	29.46	12	59.1	29	9.76	22	28.2	14	0.78	13	61.9	22
July 8.9	22.51	18	64.3	16	29.62	16	56.2	29	10.04	28	26.9	13	0.95	17	59.8	21
18.9	22.72	21	62.7	16	29.82	20	53.4	28	10.36	32	25.7	12	1.15	20	57.7	21
28.9	22.96	24	61.2	15	30.06	24	50.8	26	10.72	36	24.8	9	1.37	22	55.7	20
Aug. 7.9	23.22	26	59.9	13	30.32	26	48.6	22	11.11	39	24.1	7	1.62	25	53.9	18
17.8	23.50	28	58.7	12	30.61	29	46.7	19	11.53	42	23.6	5	1.89	27	52.4	15
27.8	23.78	28	57.8	9	30.92	31	45.2	15	11.97	44	23.2	4	2.17	28	51.2	12
Sept. 6.8	24.07	29	57.2	6	31.24	32	44.2	10	12.43	46	23.0	2	2.46	29	50.4	8
16.7	24.37	30	56.8	4	31.57	33	43.7	5	12.89	46	23.0	0	2.76	30	49.9	5
26.7	24.67	30	56.7	1	31.90	33	43.8	1	13.35	46	23.3	3	3.06	30	49.9	0
Oct. 6.7	24.96	29	57.0	3	32.22	32	44.5	7	13.80	45	23.8	5	3.36	30	50.3	4
16.7	25.25	29	57.6	6	32.53	31	45.7	12	14.24	44	24.4	6	3.65	29	51.2	9
26.6	25.52	27	58.4	8	32.82	29	47.4	17	14.67	43	25.2	8	3.92	27	52.4	12
Nov. 5.6	25.78	26	59.5	11	33.09	27	49.6	22	15.07	40	26.2	10	4.18	26	54.0	16
15.6	26.02	24	60.8	13	33.33	24	52.1	25	15.44	37	27.4	12	4.42	24	55.8	18
25.6	26.23	21	62.3	15	33.53	20	54.9	28	15.77	33	28.8	14	4.63	21	57.9	21
Dec. 5.5	26.41	18	63.8	15	33.69	16	57.9	30	16.05	28	30.3	15	4.80	17	60.1	22
15.5	26.55	14	65.3	15	33.81	12	60.9	30	16.28	23	31.9	16	4.94	14	62.3	22
25.5	26.65	10	66.8	15	33.87	6	63.9	30	16.44	16	33.5	16	5.04	10	64.5	22
35.4	26.72	7	68.2	14	33.88	1	66.7	28	16.54	10	35.2	17	5.09	5	66.6	21
Sec δ, Tan δ	1.001		−0.035		1.208		−0.677		1.549		+1.183		1.035		−0.265	
Mean Place	22s.119		76″.63		29s.919		72″.02		9s.527		21″.25		0s.773		73″.23	
D′ψ a, Dω a	0.00		0.00		−0.02		0.00		+0.03		−0.01		−0.01		0.00	
Dψ δ, Dω δ	0.0		+1.0		0.0		+1.0		0.0		+1.0		0.0		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	κ Orionis. Mag. 2.2				δ Doradus. Mag. 4.5				ν Aurigæ. Mag. 4.2				δ Leporis. Mag. 3.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	5 43		− 9 41		5 44		−65 45		5 45		+39 7		5 47		−20 52	
	s		″		s		″		s		″		s		″	
Jan. 0.5	39.06		53.1		40.21		61.7		29.10		36.8		36.11		63.3	
10.4	39.09	3	54.8	17	40.03	18	65.0	33	29.16	6	37.9	11	36.13	2	65.6	23
20.4	39.07	2	56.4	16	39.75	28	68.0	30	29.16	0	38.9	10	36.10	3	67.6	20
30.4	39.01	6	57.7	13	39.39	36	70.6	26	29.11	5	39.9	10	36.03	7	69.4	18
Feb. 9.4	38.91	10	58.8	11	38.95	44	72.7	21	29.00	11	40.7	8	35.91	12	70.9	15
19.3	38.78	13	59.7	9	38.45	50	74.3	16	28.85	15	41.3	6	35.76	15	72.1	12
Mar. 1.3	38.62	16	60.3	6	37.91	54	75.4	11	28.67	18	41.8	5	35.59	17	72.9	8
11.3	38.45	17	60.6	3	37.35	56	75.9	5	28.46	21	42.0	2	35.40	19	73.3	4
21.2	38.27	18	60.6	0	36.78	57	75.9	0	28.25	21	42.0	0	35.20	20	73.4	1
31.2	38.10	17	60.4	2	36.21	57	75.3	6	28.04	21	41.8	2	35.01	19	73.1	3
Apr. 10.2	37.94	16	59.9	5	35.67	54	74.2	11	27.85	19	41.3	5	34.83	18	72.5	6
20.2	37.81	13	59.1	8	35.18	49	72.7	15	27.69	16	40.7	6	34.68	15	71.5	10
30.1	37.71	10	58.1	10	34.74	44	70.7	20	27.57	12	39.9	8	34.56	12	70.2	13
May 10.1	37.64	7	56.9	12	34.37	37	68.3	24	27.50	7	39.0	9	34.47	9	68.6	16
20.1	37.61	3	55.5	14	34.08	29	65.5	28	27.48	2	38.1	9	34.42	5	66.8	18
30.1	37.62	1	53.9	16	33.87	21	62.4	31	27.51	3	37.1	10	34.41	1	64.8	20
June 9.0	37.67	5	52.1	18	33.75	12	59.1	33	27.60	9	36.1	10	34.45	4	62.6	22
19.0	37.77	10	50.3	18	33.72	3	55.7	34	27.74	14	35.2	9	34.53	8	60.2	24
29.0	37.90	13	48.4	19	33.78	6	52.3	34	27.93	19	34.3	9	34.65	12	57.8	24
July 8.9	38.07	17	46.4	20	33.93	15	48.9	34	28.16	23	33.6	7	34.81	16	55.4	24
18.9	38.27	20	44.5	19	34.17	24	45.7	32	28.43	27	33.0	6	35.00	19	53.1	23
28.9	38.50	23	42.8	17	34.49	32	42.7	30	28.73	30	32.5	5	35.22	22	50.9	22
Aug. 7.9	38.75	25	41.2	16	34.88	39	40.0	27	29.06	33	32.1	4	35.47	25	49.0	19
17.8	39.02	27	39.8	14	35.33	45	37.7	23	29.42	36	31.8	3	35.74	27	47.3	17
27.8	39.30	28	38.7	11	35.83	50	36.0	17	29.79	37	31.6	2	36.03	29	46.0	13
Sept. 6.8	39.59	29	37.9	8	36.37	54	34.9	11	30.17	38	31.5	1	36.32	29	45.1	9
16.8	39.89	30	37.5	4	36.93	56	34.4	5	30.56	39	31.6	1	36.62	30	44.6	5
26.7	40.19	30	37.5	0	37.50	57	34.5	1	30.95	39	31.8	2	36.93	31	44.6	0
Oct. 6.7	40.48	29	37.9	4	38.06	56	35.2	7	31.34	39	32.0	2	37.23	30	45.1	5
16.7	40.76	28	38.6	7	38.59	53	36.6	14	31.72	38	32.3	3	37.53	30	46.1	10
26.6	41.04	28	39.7	11	39.08	49	38.6	20	32.08	36	32.7	4	37.81	28	47.5	14
Nov. 5.6	41.30	26	41.1	14	39.51	43	41.2	26	32.43	35	33.3	6	38.07	26	49.3	18
15.6	41.54	24	42.8	17	39.87	36	44.2	30	32.75	32	34.0	7	38.31	24	51.4	21
25.6	41.75	21	44.6	18	40.15	28	47.5	33	33.04	29	34.8	8	38.52	21	53.7	23
Dec. 5.5	41.93	18	46.5	19	40.33	18	51.0	35	33.29	25	35.6	8	38.70	18	56.2	25
15.5	42.07	14	48.5	20	40.41	8	54.6	36	33.50	21	36.5	9	38.84	14	58.8	26
25.5	42.17	10	50.5	20	40.39	2	58.2	36	33.65	15	37.5	10	38.94	10	61.3	25
35.5	42.23	6	52.3	18	40.27	12	61.6	34	33.75	10	38.6	11	38.99	5	63.7	24
Sec δ, Tan δ	1.015		−0.171		2.436		−2.222		1.289		+0.813		1.070		−0.382	
Mean Place	37s.807		59″.33		36s.904		65″.38		27s.569		26″.60		34s.765		68″.83	
D′ψ α, Dω α	0.00		0.00		−0.06		+0.01		+0.02		0.00		−0.01		0.00	
Dψ δ, Dω δ	0.0		+1.0		0.0		+1.0		0.0		+1.0		0.0		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Orionis. Var. 1.0–1.4				δ Aurigæ. Mag. 3.9				η Leporis. Mag. 3.8				β Aurigæ. Mag. 2.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 5 50 s		° ′ + 7 23 ″		h m 5 52 s		° ′ +54 16 ″		h m 5 52 s		° ′ −14 10 ″		h m 5 53 s		° ′ +44 56 ″	
Jan. 0.5	28.92		37.6		23.96		56.4		27.82		52.4		10.57		33.2	
10.4	28.97	5	36.7	9	24.03	7	58.3	19	27.85	3	54.3	19	10.64	7	34.6	14
20.4	28.97	0	36.0	7	24.02	1	60.1	18	27.84	1	56.1	18	10.65	1	35.9	13
30.4	28.93	4	35.4	6	23.93	9	61.8	17	27.78	6	57.7	16	10.59	6	37.1	12
Feb. 9.4	28.85	8	34.9	5	23.78	15	63.2	14	27.68	10	59.0	13	10.47	12	38.2	11
19.3	28.74	11	34.5	4	23.57	21	64.4	12	27.55	13	60.0	10	10.31	16	39.1	9
Mar. 1.3	28.60	14	34.3	2	23.31	26	65.2	8	27.39	16	60.7	7	10.11	20	39.7	6
11.3	28.44	16	34.2	1	23.02	29	65.7	5	27.21	18	61.1	4	9.88	23	40.0	3
21.2	28.27	17	34.1	1	22.73	29	65.8	1	27.03	18	61.1	0	9.64	24	40.1	1
31.2	28.11	16	34.2	1	22.44	29	65.5	3	26.85	18	60.9	2	9.41	23	39.9	2
Apr. 10.2	27.96	15	34.4	2	22.17	27	64.8	7	26.68	17	60.4	5	9.20	21	39.4	5
20.2	27.83	13	34.6	2	21.94	23	63.8	10	26.53	15	59.6	8	9.02	18	38.7	7
30.1	27.73	10	35.0	4	21.76	18	62.6	12	26.41	12	58.5	11	8.88	14	37.8	9
May 10.1	27.67	6	35.5	5	21.64	12	61.1	15	26.33	8	57.2	13	8.79	9	36.7	11
20.1	27.65	2	36.1	6	21.59	5	59.5	16	26.29	4	55.6	16	8.75	4	35.5	12
30.1	27.67	2	36.9	8	21.60	1	57.8	17	26.29	0	53.8	18	8.77	2	34.2	13
June 9.0	27.73	6	37.7	8	21.68	8	56.0	18	26.34	5	51.8	20	8.85	8	32.9	13
19.0	27.84	11	38.6	9	21.83	15	54.2	18	26.42	8	49.8	20	8.98	13	31.6	13
29.0	27.98	14	39.6	10	22.05	22	52.5	17	26.54	12	47.7	21	9.17	19	30.4	12
July 8.9	28.16	18	40.6	10	22.33	28	50.9	16	26.70	16	45.6	21	9.41	24	29.3	11
18.9	28.37	21	41.7	11	22.66	33	49.5	14	26.89	19	43.5	21	9.70	29	28.3	10
28.9	28.60	23	42.7	10	23.03	37	48.3	12	27.11	22	41.5	20	10.02	32	27.4	9
Aug. 7.9	28.86	26	43.6	9	23.45	42	47.2	11	27.35	24	39.8	17	10.37	35	26.7	7
17.8	29.14	28	44.4	8	23.90	45	46.3	9	27.61	26	38.3	15	10.75	38	26.2	5
27.8	29.43	29	45.0	6	24.37	47	45.6	7	27.89	28	37.1	12	11.15	40	25.8	4
Sept. 6.8	29.72	29	45.5	5	24.86	49	45.2	4	28.18	29	36.2	9	11.56	41	25.5	3
16.8	30.02	30	45.8	3	25.36	50	45.0	2	28.47	29	35.8	4	11.98	42	25.4	1
26.7	30.33	31	45.9	1	25.87	51	45.1	1	28.77	30	35.8	0	12.40	42	25.5	1
Oct. 6.7	30.63	30	45.7	2	26.37	50	45.4	3	29.07	30	36.2	4	12.82	42	25.7	2
16.7	30.93	30	45.3	4	26.86	49	46.0	6	29.36	29	37.0	8	13.24	42	26.1	4
26.6	31.22	29	44.7	6	27.34	48	46.8	8	29.64	28	38.2	12	13.64	40	26.6	5
Nov. 5.6	31.49	27	43.9	8	27.79	45	47.8	10	29.91	27	39.7	15	14.02	38	27.3	7
15.6	31.75	26	43.0	9	28.21	42	49.0	12	30.15	24	41.5	18	14.38	36	28.2	9
25.6	31.98	23	42.0	10	28.59	38	50.5	15	30.37	22	43.6	21	14.71	33	29.2	10
Dec. 5.5	32.18	20	41.0	10	28.91	32	52.1	16	30.56	19	45.8	22	14.99	28	30.3	11
15.5	32.35	17	40.0	10	29.17	26	53.9	18	30.71	15	48.0	22	15.22	23	31.5	12
25.5	32.47	12	39.0	10	29.37	20	55.7	18	30.81	10	50.2	22	15.39	17	32.8	13
35.5	32.55	8	38.1	9	29.49	12	57.6	19	30.87	6	52.3	21	15.50	11	34.2	14
Sec δ, Tan δ	1.008		+0.130		1.713		+1.391		1.031		−0.253		1.413		+0.998	
Mean Place	27ˢ.691		29″.98		21ˢ.869		45″.53		26ˢ.532		58″.44		8ˢ.857		22″.89	
D′ψ α, Dω α	0.00		0.00		+0.04		0.00		−0.01		0.00		+0.03		0.00	
Dψ δ, Dω δ	0.0		+1.0		0.0		+1.0		0.0		+1.0		0.0		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Aurigæ. Mag. 2.7				1 Geminorum. Mag. 4.3				1 Puppis (G.). Mag. 6.2				ν Orionis. Mag. 4.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 5 53		° ′ +37 12		h m 5 58		° ′ +23 16		h m 6 1		° ′ −45 1		h m 6 2		° ′ +14 46	
	s		″		s		″		s		″		s		″	
Jan. 0.5	48.84	7	36.5	9	51.25	7	16.5	1	60.01	2	64.7	32	37.58	7	54.8	4
10.4	48.91	1	37.4	9	51.32	2	16.6	1	59.99	8	67.9	29	37.65	2	54.4	4
20.4	48.92	4	38.3	9	51.34	3	16.7	2	59.91	13	70.8	25	37.67	3	54.0	3
30.4	48.88	10	39.2	8	51.31	8	16.9	2	59.78	19	73.3	22	37.64	7	53.7	1
Feb. 9.4	48.78	14	40.0	6	51.23	12	17.1	1	59.59	23	75.5	17	37.57	11	53.6	1
19.3	48.64	17	40.6	5	51.11	15	17.2	2	59.36	27	77.2	12	37.46	14	53.5	1
Mar. 1.3	48.47	20	41.1	3	50.96	17	17.4	1	59.09	29	78.4	7	37.32	16	53.4	0
11.3	48.27	21	41.4	0	50.79	17	17.5	0	58.80	29	79.1	3	37.16	17	53.4	0
21.3	48.06	20	41.4	2	50.62	17	17.5	1	58.51	29	79.4	3	36.99	17	53.4	0
31.2	47.86	19	41.2	3	50.45	16	17.4	1	58.22	28	79.1	8	36.82	15	53.4	0
Apr. 10.2	47.67	16	40.9	5	50.29	14	17.3	1	57.94	26	78.3	12	36.67	13	53.4	1
20.2	47.51	12	40.4	7	50.15	10	17.2	2	57.68	22	77.1	16	36.54	10	53.5	1
30.1	47.39	7	39.7	8	50.05	7	17.0	1	57.46	18	75.5	21	36.44	7	53.6	2
May 10.1	47.32	3	38.9	9	49.98	3	16.9	2	57.28	13	73.4	24	36.37	3	53.8	3
20.1	47.29	2	38.0	9	49.95	2	16.7	1	57.15	8	71.0	27	36.34	1	54.1	3
30.1	47.31	8	37.1	8	49.97	7	16.6	1	57.07	3	68.3	30	36.35	6	54.4	4
June 9.0	47.39	13	36.3	8	50.04	11	16.5	1	57.04	2	65.3	31	36.41	10	54.8	4
19.0	47.52	17	35.5	8	50.15	15	16.4	1	57.06	7	62.2	32	36.51	14	55.2	5
29.0	47.69	22	34.7	7	50.30	19	16.5	1	57.13	13	59.0	31	36.65	17	55.7	6
July 9.0	47.91	26	34.0	6	50.49	22	16.6	1	57.26	18	55.9	30	36.82	21	56.3	6
18.9	48.17	29	33.4	5	50.71	25	16.7	1	57.44	23	52.9	29	37.03	23	56.9	6
28.9	48.46	32	32.9	4	50.96	28	16.8	2	57.67	26	50.0	26	37.26	26	57.5	5
Aug. 7.9	48.78	34	32.5	3	51.24	30	17.0	2	57.93	29	47.4	22	37.52	28	58.0	5
17.8	49.12	36	32.2	2	51.54	31	17.2	2	58.22	32	45.2	18	37.80	30	58.5	4
27.8	49.48	37	32.0	1	51.85	32	17.4	1	58.54	35	43.4	13	38.10	30	58.9	3
Sept. 6.8	49.85	38	31.9	0	52.17	33	17.5	1	58.89	36	42.1	7	38.40	31	59.2	1
16.8	50.23	38	31.9	1	52.50	33	17.6	0	59.25	36	41.4	1	38.71	31	59.3	0
26.7	50.61	38	32.0	1	52.83	33	17.6	1	59.61	37	41.3	6	39.02	32	59.3	1
Oct. 6.7	50.99	37	32.1	2	53.16	33	17.5	1	59.98	36	41.9	11	39.34	31	59.2	3
16.7	51.36	36	32.3	3	53.49	32	17.4	2	60.34	34	43.0	17	39.65	30	58.9	5
26.7	51.72	35	32.6	4	53.81	30	17.2	2	60.68	31	44.7	23	39.95	29	58.4	5
Nov. 5.6	52.07	33	33.0	4	54.11	29	17.0	2	60.99	28	47.0	27	40.24	28	57.9	6
15.6	52.40	29	33.4	6	54.40	26	16.8	2	61.27	24	49.7	30	40.52	25	57.3	7
25.6	52.69	25	34.0	7	54.66	23	16.6	1	61.51	19	52.7	32	40.77	22	56.6	7
Dec. 5.5	52.94	21	34.7	8	54.89	19	16.5	1	61.70	14	55.9	34	40.99	19	55.9	6
15.5	53.15	16	35.5	9	55.08	15	16.4	1	61.84	8	59.3	34	41.18	14	55.3	6
25.5	53.31	11	36.4	9	55.23	11	16.3	1	61.92	2	62.7	33	41.32	10	54.7	5
35.5	53.42		37.3		55.34		16.4		61.94		66.0		41.42		54.2	
Sec δ, Tan δ	1.256		+0.759		1.089		+0.430		1.415		−1.001		1.034		+0.264	
Mean Place	47ˢ.318		26″.80		49ˢ.915		7″.90		58ˢ.179		70″.00		36ˢ.305		46″.84	
D′ψ α, Dω α	+0.02		0.00		+0.01		0.00		−0.03		0.00		+0.01		0.00	
Dψ δ, Dω δ	0.0		+1.0		0.0		+1.0		0.0		+1.0		0.0		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**22 H. Camelop.** Mag. 4.7				**η Geminorum.** Var. 3.2–4.2				**2 Lyncis.** Mag. 4.4				**ζ Canis Majoris.** Mag. 3.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	6 9		+69 21		6 9		+22 31		6 11		+59 2		6 16		−30 1	
	s		″		s		″		s		″		s		″	
Jan. 0.5	19.41	10	17.6	26	38.95	8	66.6	0	59.50	11	47.4	21	59.78	4	21.6	28
10.5	19.51	3	20.2	25	39.03	3	66.6	1	59.61	1	49.5	21	59.82	2	24.4	26
20.4	19.48	15	22.7	24	39.06	2	66.7	1	59.62	7	51.6	20	59.80	7	27.0	23
30.4	19.33	27	25.1	21	39.04	7	66.8	2	59.55	16	53.6	17	59.73	11	29.3	19
Feb. 9.4	19.06	36	27.2	17	38.97	11	67.0	2	59.39	23	55.3	15	59.62	16	31.2	16
19.3	18.70	44	28.9	13	38.86	14	67.2	1	59.16	28	56.8	11	59.46	19	32.8	12
Mar. 1.3	18.26	50	30.2	8	38.72	16	67.3	1	58.88	32	57.9	7	59.27	21	34.0	8
11.3	17.76	52	31.0	4	38.56	17	67.4	1	58.56	34	58.6	4	59.06	22	34.8	3
21.3	17.24	52	31.4	2	38.39	18	67.5	0	58.22	34	59.0	1	58.84	22	35.1	1
31.2	16.72	49	31.2	7	38.21	16	67.5	0	57.88	32	58.9	5	58.62	21	35.0	5
Apr. 10.2	16.23	44	30.5	11	38.05	14	67.5	1	57.56	28	58.4	9	58.41	19	34.5	9
20.2	15.79	37	29.4	15	37.91	11	67.4	1	57.28	24	57.5	13	58.22	17	33.6	13
30.2	15.42	28	27.9	18	37.80	8	67.3	1	57.04	18	56.2	15	58.05	13	32.3	16
May 10.1	15.14	18	26.1	21	37.72	3	67.2	1	56.86	10	54.7	17	57.92	9	30.7	20
20.1	14.96	8	24.0	23	37.69	1	67.1	1	56.76	2	53.0	19	57.83	5	28.7	22
30.1	14.88	4	21.7	25	37.70	5	67.0	1	56.74	5	51.1	20	57.78	0	26.5	24
June 9.0	14.92	15	19.2	25	37.75	10	66.9	0	56.79	12	49.1	20	57.78	4	24.1	26
19.0	15.07	25	16.7	24	37.85	14	66.9	0	56.91	20	47.1	20	57.82	8	21.5	27
29.0	15.32	36	14.3	24	37.99	18	66.9	1	57.11	27	45.1	19	57.90	12	18.8	27
July 9.0	15.68	45	11.9	23	38.17	21	67.0	1	57.38	33	43.2	18	58.02	16	16.1	26
18.9	16.13	54	9.6	20	38.38	24	67.1	2	57.71	39	41.4	17	58.18	20	13.5	25
28.9	16.67	61	7.6	18	38.62	27	67.3	1	58.10	44	39.7	15	58.38	23	11.0	23
Aug. 7.9	17.28	67	5.8	15	38.89	28	67.4	1	58.54	48	38.2	12	58.61	25	8.7	20
17.9	17.95	72	4.3	12	39.17	30	67.5	1	59.02	51	37.0	10	58.86	28	6.7	16
27.8	18.67	76	3.1	9	39.47	32	67.6	1	59.53	54	36.0	8	59.14	30	5.1	11
Sept. 6.8	19.43	79	2.2	6	39.79	33	67.7	0	60.07	56	35.2	5	59.44	31	4.0	7
16.8	20.22	80	1.6	2	40.12	33	67.7	1	60.63	56	34.7	2	59.75	31	3.3	2
26.7	21.02	80	1.4	2	40.45	33	67.6	1	61.19	57	34.5	1	60.06	32	3.1	4
Oct. 6.7	21.82	80	1.6	5	40.78	33	67.5	2	61.76	56	34.6	4	60.38	32	3.5	9
16.7	22.62	77	2.1	9	41.11	32	67.3	3	62.32	55	35.0	6	60.70	31	4.4	15
26.7	23.39	73	3.0	13	41.43	31	67.0	3	62.87	52	35.6	9	61.01	29	5.9	19
Nov. 5.6	24.12	68	4.3	16	41.74	29	66.7	3	63.39	49	36.5	12	61.30	27	7.8	23
15.6	24.80	60	5.9	19	42.03	27	66.4	3	63.88	45	37.7	15	61.57	24	10.1	26
25.6	25.40	52	7.8	22	42.30	24	66.1	3	64.33	39	39.2	17	61.81	21	12.7	29
Dec. 5.6	25.92	42	10.0	24	42.54	20	65.8	2	64.72	32	40.9	19	62.02	16	15.6	30
15.5	26.34	30	12.4	25	42.74	16	65.6	1	65.04	24	42.8	20	62.18	11	18.6	30
25.5	26.64	18	14.9	26	42.90	12	65.5	0	65.28	16	44.8	21	62.29	7	21.6	29
35.5	26.82		17.5		43.02		65.5		65.44		46.9		62.36		24.5	
Sec δ, Tan δ	2.836		+2.654		1.083		+0.415		1.944		+1.667		1.155		−0.578	
Mean Place	15ˢ.751		7″.24		37ˢ.608		58″.39		57ˢ.010		37″.64		58ˢ.322		27″.97	
D′ψ a, Dω a	+0.07		+0.01		+0.01		0.00		+0.05		+0.01		−0.02		0.00	
Dψ δ, Dω δ	0.0		+1.0		0.0		+1.0		0.0		+1.0		0.0		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

a Mean Solar Date.	μ Geminorum. Mag. 3.2				ψ¹ Aurigæ. Mag. 5.1				β Canis Majoris. Mag. 2.0				8 Monocerotis. Mag. 4.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	6 17		+22 33		6 18		+49 19		6 18		−17 54		6 19		+ 4 38	
	s		″		s		″		s		″		s		″	
Jan. 0.5	43.22	9	40.9	0	14.00	11	69.4	16	53.41	5	36.4	23	10.76	7	23.5	11
10.5	43.31	4	40.9	1	14.11	4	71.0	16	53.46	0	38.7	21	10.83	3	22.4	10
20.4	43.35	2	41.0	1	14.15	4	72.6	15	53.46	4	40.8	19	10.86	2	21.4	8
30.4	43.33	6	41.1	2	14.11	10	74.1	14	53.42	9	42.7	16	10.84	6	20.6	6
Feb. 9.4	43.27	10	41.3	2	14.01	16	75.5	12	53.33	12	44.3	12	10.78	10	20.0	5
19.3	43.17	14	41.5	2	13.85	21	76.7	10	53.21	15	45.5	9	10.68	13	19.5	3
Mar. 1.3	43.03	16	41.7	1	13.64	24	77.7	6	53.06	18	46.4	6	10.55	15	19.2	2
11.3	42.87	17	41.8	1	13.40	25	78.3	3	52.88	19	47.0	3	10.40	16	19.0	1
21.3	42.70	17	41.9	1	13.15	26	78.6	0	52.69	19	47.3	1	10.24	17	18.9	1
31.2	42.53	17	42.0	0	12.89	25	78.6	3	52.50	18	47.2	4	10.07	16	19.0	2
Apr. 10.2	42.36	15	42.0	1	12.64	22	78.3	6	52.32	16	46.8	7	9.91	14	19.2	3
20.2	42.21	11	41.9	1	12.42	18	77.7	9	52.16	13	46.1	10	9.77	11	19.5	4
30.2	42.10	8	41.8	1	12.24	13	76.8	12	52.03	10	45.1	13	9.66	8	19.9	6
May 10.1	42.02	4	41.7	1	12.11	7	75.6	13	51.93	7	43.8	16	9.58	4	20.5	7
20.1	41.98	0	41.6	1	12.04	1	74.3	14	51.86	3	42.2	18	9.54	1	21.2	8
30.1	41.98	5	41.5	1	12.03	4	72.9	15	51.83	1	40.4	20	9.53	4	22.0	9
June 9.0	42.03	9	41.4	1	12.07	11	71.4	16	51.84	5	38.4	21	9.57	8	22.9	10
19.0	42.12	13	41.3	0	12.18	17	69.8	15	51.89	9	36.3	22	9.65	11	23.9	10
29.0	42.25	17	41.3	1	12.35	22	68.3	15	51.98	13	34.1	22	9.76	15	24.9	11
July 9.0	42.42	21	41.4	1	12.57	27	66.8	14	52.11	17	31.9	21	9.91	18	26.0	11
18.9	42.63	23	41.5	0	12.84	32	65.4	13	52.28	20	29.8	21	10.09	21	27.1	10
28.9	42.86	26	41.5	1	13.16	35	64.1	11	52.48	22	27.7	19	10.30	23	28.1	9
Aug. 7.9	43.12	28	41.6	1	13.51	38	63.0	10	52.70	25	25.8	16	10.53	26	29.0	8
17.9	43.40	30	41.7	1	13.89	41	62.0	8	52.95	27	24.2	13	10.79	27	29.8	7
27.8	43.70	32	41.8	0	14.30	43	61.2	6	53.22	28	22.9	10	11.06	29	30.5	5
Sept. 6.8	44.02	32	41.8	1	14.73	45	60.6	5	53.50	29	21.9	6	11.35	29	31.0	2
16.8	44.34	33	41.7	2	15.18	45	60.1	3	53.79	30	21.3	1	11.64	30	31.2	1
26.7	44.67	33	41.5	2	15.63	46	59.8	1	54.09	30	21.2	4	11.94	31	31.1	3
Oct. 6.7	45.00	33	41.3	2	16.09	46	59.7	2	54.39	30	21.6	8	12.25	30	30.8	5
16.7	45.33	33	41.1	3	16.55	45	59.9	3	54.69	30	22.4	13	12.55	30	30.3	8
26.7	45.66	32	40.8	4	17.00	43	60.2	5	54.99	29	23.7	16	12.85	29	29.5	10
Nov. 5.6	45.98	30	40.4	4	17.43	41	60.7	8	55.28	26	25.3	20	13.14	27	28.5	12
15.6	46.28	27	40.0	4	17.84	37	61.5	10	55.54	24	27.3	22	13.41	25	27.3	12
25.6	46.55	25	39.6	3	18.21	33	62.5	12	55.78	21	29.5	24	13.66	22	26.1	13
Dec. 5.6	46.80	21	39.3	2	18.54	28	63.7	13	55.99	17	31.9	25	13.88	19	24.8	13
15.5	47.01	17	39.1	1	18.82	22	65.0	15	56.16	13	34.4	25	14.07	15	23.5	12
25.5	47.18	12	39.0	1	19.04	15	66.5	16	56.29	8	36.9	24	14.22	11	22.3	12
35.5	47.30		38.9		19.19		68.1		56.37		39.3		14.33		21.1	
Sec δ, Tan δ	1.083		+0.415		1.535		+1.164		1.051		−0.323		1.003		+0.081	
Mean Place	41ˢ.863		32″.99		12ˢ.034		60″.45		52ˢ.089		43″.07		9ˢ.504		16″.24	
D′ψ a, Dω a	+0.01		0.00		+0.03		+0.01		−0.01		0.00		0.00		0.00	
Dψ δ, Dω δ	0.0		+1.0		0.0		+1.0		0.0		+1.0		0.0		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*α* **Argûs.** Mag. −0.9				**10 Monocerotis.** Mag. 5.0				*ν* **Geminorum.** Mag. 4.1				**8 Lyncis.** Mag. 6.0			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	6 21		−52 38		6 23		− 4 42		6 23		+20 16		6 29		+61 33	
	s		″		s		″		s		″		s		″	
Jan. 0.5	63.36	2	45.8	34	41.12	7	20.3	16	49.20	9	12.8	1	47.44	14	40.8	23
10.5	63.34	9	49.2	32	41.19	2	21.9	14	49.29	4	12.7	1	47.58	4	43.1	22
20.4	63.25	16	52.4	29	41.21	2	23.3	13	49.33	0	12.6	0	47.62	6	45.3	21
30.4	63.09	22	55.3	25	41.19	6	24.6	11	49.33	6	12.6	1	47.56	15	47.4	20
Feb. 9.4	62.87	27	57.8	20	41.13	10	25.7	8	49.27	10	12.7	1	47.41	22	49.4	17
19.4	62.60	31	59.8	16	41.03	14	26.5	6	49.17	13	12.8	2	47.19	29	51.1	13
Mar. 1.3	62.29	34	61.4	11	40.89	16	27.1	4	49.04	16	13.0	1	46.90	34	52.4	10
11.3	61.95	35	62.5	5	40.73	17	27.5	2	48.88	17	13.1	1	46.56	37	53.4	5
21.3	61.60	36	63.0	0	40.56	17	27.7	0	48.71	17	13.2	1	46.19	37	53.9	1
31.2	61.24	35	63.0	5	40.39	16	27.7	3	48.54	16	13.3	0	45.82	36	54.0	3
Apr. 10.2	60.89	33	62.5	10	40.23	14	27.4	5	48.38	14	13.3	0	45.46	32	53.7	8
20.2	60.56	29	61.5	15	40.09	12	26.9	7	48.24	12	13.3	0	45.14	28	52.9	12
30.2	60.27	25	60.0	20	39.97	9	26.2	9	48.12	9	13.3	0	44.86	22	51.7	15
May 10.1	60.02	20	58.0	23	39.88	6	25.3	10	48.03	4	13.3	0	44.64	14	50.2	17
20.1	59.82	14	55.7	26	39.82	1	24.3	12	47.99	0	13.3	0	44.50	7	48.5	19
30.1	59.68	9	53.1	29	39.81	2	23.1	14	47.99	4	13.3	0	44.43	1	46.6	21
June 9.1	59.59	3	50.2	31	39.83	7	21.7	15	48.03	8	13.3	1	44.44	9	44.5	21
19.0	59.56	4	47.1	32	39.90	10	20.2	15	48.11	13	13.4	1	44.53	18	42.4	22
29.0	59.60	9	43.9	33	40.00	13	18.7	15	48.24	16	13.5	2	44.71	25	40.2	22
July 9.0	59.69	15	40.6	32	40.13	17	17.2	16	48.40	19	13.7	2	44.96	32	38.0	21
18.9	59.84	21	37.4	31	40.30	20	15.6	15	48.59	23	13.9	2	45.28	38	35.9	19
28.9	60.05	26	34.3	28	40.50	23	14.1	13	48.82	25	14.1	2	45.66	44	34.0	17
Aug. 7.9	60.31	30	31.5	24	40.73	24	12.8	12	49.07	27	14.3	1	46.10	49	32.3	15
17.9	60.61	34	29.1	20	40.97	26	11.6	9	49.34	29	14.4	1	46.59	53	30.8	13
27.8	60.95	37	27.1	15	41.23	28	10.7	7	49.63	31	14.5	0	47.12	56	29.5	11
Sept. 6.8	61.32	40	25.6	9	41.51	29	10.0	4	49.94	31	14.5	1	47.68	58	28.4	8
16.8	61.72	41	24.7	3	41.80	30	9.6	0	50.25	32	14.4	1	48.26	60	27.6	5
26.8	62.13	41	24.4	4	42.10	30	9.6	3	50.57	33	14.3	3	48.86	61	27.1	2
Oct. 6.7	62.54	41	24.8	10	42.40	30	9.9	7	50.90	33	14.0	4	49.47	61	26.9	1
16.7	62.95	39	25.8	16	42.70	29	10.6	10	51.23	32	13.6	4	50.08	60	27.0	4
26.7	63.34	37	27.4	21	42.99	28	11.6	13	51.55	31	13.2	5	50.68	58	27.4	7
Nov. 5.6	63.71	33	29.5	27	43.27	27	12.9	15	51.86	30	12.7	5	51.26	55	28.1	11
15.6	64.04	28	32.2	31	43.54	25	14.4	17	52.16	28	12.2	5	51.81	50	29.2	14
25.6	64.32	23	35.3	34	43.79	22	16.1	18	52.44	25	11.7	5	52.31	44	30.6	16
Dec. 5.6	64.55	17	38.7	35	44.01	19	17.9	18	52.69	21	11.2	4	52.75	37	32.2	19
15.5	64.72	9	42.2	36	44.20	15	19.7	18	52.90	17	10.8	3	53.12	29	34.1	21
25.5	64.81	3	45.8	35	44.35	10	21.5	18	53.07	13	10.5	2	53.41	20	36.2	22
35.5	64.84		49.3		44.45		23.3		53.20		10.3		53.61		38.4	
Sec *δ*, Tan *δ*	1.648		−1.310		1.003		−0.082		1.066		+0.369		2.100		+1.846	
Mean Place	61ˢ.238		52″.37		39ˢ.862		27″.26		47ˢ.853		5″.17		44ˢ.636		32″.38	
D′ψ *α*, Dω *α*	−0.03		−0.01		0.00		0.00		+0.01		0.00		+0.05		+0.02	
Dψ *δ*, Dω *δ*	0.0		+1.0		0.0		+1.0		0.0		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	23 H. Camelop. Mag. 5.6				ξ^2 Canis Majoris. Mag. 4.5				51 Aurigæ. Mag. 5.7				γ Geminorum. Mag. 1.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	6 31		+79 39		6 31		−22 53		6 32		+39 28		6 32		+16 28	
	s		″		s		″		s		″		s		″	
Jan. 0.5	32.02		48.3		25.98		34.0		39.58		14.4		42.51		35.0	
10.5	32.24	22	51.3	30	26.04	6	36.6	26	39.69	11	15.4	10	42.61	10	34.6	4
20.4	32.20	4	54.3	30	26.05	1	39.0	24	39.75	6	16.5	11	42.66	5	34.3	3
30.4	31.92	28	57.1	28	26.01	4	41.1	21	39.75	0	17.6	11	42.66	0	34.1	2
Feb. 9.4	31.41	51	59.6	25	25.92	9	42.9	18	39.69	6	18.6	10	42.61	5	34.0	1
19.4	30.70	71	61.7	21	25.79	13	44.4	15	39.57	12	19.5	9	42.52	9	34.0	0
Mar. 1.3	29.83	87	63.4	17	25.63	16	45.6	12	39.41	16	20.2	7	42.40	12	34.0	0
11.3	28.84	99	64.6	12	25.45	18	46.4	8	39.22	19	20.8	6	42.25	15	34.1	1
21.3	27.78	106	65.3	7	25.26	19	46.8	4	39.02	20	21.2	4	42.08	17	34.2	1
31.2	26.70	108	65.4	1	25.06	20	46.8	0	38.81	21	21.3	1	41.91	17	34.2	0
Apr. 10.2	25.65	105	64.9	5	24.87	19	46.4	4	38.60	21	21.2	1	41.75	16	34.3	1
20.2	24.67	98	63.8	11	24.69	18	45.7	7	38.41	19	20.9	3	41.61	14	34.4	1
30.2	23.80	87	62.3	15	24.54	15	44.7	10	38.26	15	20.3	6	41.49	12	34.5	1
May 10.1	23.09	71	60.4	19	24.42	12	43.4	13	38.15	11	19.6	7	41.41	8	34.7	2
20.1	22.56	53	58.1	23	24.33	9	41.7	17	38.08	7	18.8	8	41.36	5	34.8	1
30.1	22.22	34	55.5	26	24.28	5	39.8	19	38.06	2	17.9	9	41.35	1	35.0	2
June 9.1	22.08	14	52.7	28	24.27	1	37.7	21	38.09	3	16.9	10	41.38	3	35.3	3
19.0	22.16	8	49.8	29	24.31	4	35.4	23	38.18	9	15.8	11	41.45	7	35.6	3
29.0	22.45	29	46.9	29	24.39	8	33.1	23	38.32	14	14.8	10	41.56	11	35.9	3
July 9.0	22.95	50	44.1	28	24.51	12	30.7	24	38.50	18	13.8	10	41.71	15	36.2	3
18.9	23.64	69	41.3	28	24.66	15	28.3	24	38.72	22	12.9	9	41.89	18	36.6	4
28.9	24.51	87	38.7	26	24.84	18	26.0	23	38.98	26	12.0	9	42.10	21	36.9	3
Aug. 7.9	25.54	103	36.4	23	25.05	21	24.0	20	39.27	29	11.2	8	42.34	24	37.2	3
17.9	26.71	117	34.3	21	25.29	24	22.2	18	39.59	32	10.5	7	42.60	26	37.5	3
27.8	27.99	128	32.5	18	25.56	27	20.7	15	39.93	34	9.8	7	42.88	28	37.7	2
Sept. 6.8	29.37	138	31.1	14	25.84	28	19.6	11	40.29	36	9.2	6	43.17	29	37.7	0
16.8	30.83	146	30.1	10	26.13	29	19.0	6	40.67	38	8.7	5	43.48	31	37.7	0
26.8	32.33	150	29.5	6	26.43	30	18.8	2	41.06	39	8.3	4	43.80	32	37.5	2
Oct. 6.7	33.85	152	29.3	2	26.74	31	19.1	3	41.45	39	8.0	3	44.12	32	37.2	3
16.7	35.37	152	29.6	3	27.05	31	19.9	8	41.85	40	7.8	2	44.44	32	36.7	5
26.7	36.85	148	30.3	7	27.36	31	21.2	13	42.24	39	7.7	1	44.76	32	36.1	6
Nov. 5.6	38.26	141	31.4	11	27.65	29	22.9	17	42.62	38	7.8	1	45.07	31	35.4	7
15.6	39.57	131	33.0	16	27.92	27	25.0	21	42.98	36	8.0	2	45.36	29	34.7	7
25.6	40.76	119	35.0	20	28.17	25	27.4	24	43.32	34	8.4	4	45.64	28	34.0	7
Dec. 5.6	41.78	102	37.3	23	28.39	22	30.0	26	43.63	31	8.9	5	45.89	25	33.3	7
15.5	42.61	83	39.9	26	28.57	18	32.7	27	43.89	26	9.6	7	46.11	22	32.6	7
25.5	43.21	60	42.7	28	28.71	14	35.4	27	44.10	21	10.4	8	46.28	17	32.0	6
35.5	43.58	37	45.7	30	28.80	9	38.1	27	44.26	16	11.3	9	46.41	13	31.5	5
$\sec\delta$, $\tan\delta$	5.572		+5.482		1.086		−0.422		1.295		+0.823		1.043		+0.296	
Mean Place	$24^s.375$		$39''.53$		$24^s.623$		$41''.01$		$37^s.896$		$6''.67$		$41^s.195$		$27''.70$	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	+0.14		+0.05		−0.01		0.00		+0.02		+0.01		+0.01		0.00	
$D_\psi\,\delta$, $D_\omega\,\delta$	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ν Argûs. Mag. 3.2				8 Monocerotis. Mag. 4.7				ε Geminorum. Mag. 3.2				ξ Geminorum. Mag. 3.4			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 6 35		° ′ −43 6		h m 6 36		° ′ + 9 58		h m 6 38		° ′ +25 13		h m 6 40		° ′ +12 59	
	s		″		s		″		s		″		s		″	
Jan. 0.5	7.75		61.9		12.51		44.3		36.24		12.7		25.72		31.9	
10.5	7.78	3	65.2	33	12.61	10	43.5	8	36.35	11	12.8	1	25.83	11	31.3	6
20.4	7.75	3	68.3	31	12.66	5	42.8	7	36.41	6	13.0	2	25.88	5	30.8	5
30.4	7.66	9	71.1	28	12.66	0	42.3	5	36.42	1	13.3	3	25.89	1	30.4	4
Feb. 9.4	7.51	15	73.6	25	12.61	5	41.9	4	36.37	5	13.7	4	25.85	4	30.1	3
19.4	7.32	19	75.6	20	12.52	9	41.6	3	36.28	9	14.0	3	25.76	9	30.0	1
Mar. 1.3	7.09	23	77.2	16	12.40	12	41.4	2	36.15	13	14.4	4	25.64	12	29.9	1
11.3	6.83	26	78.3	11	12.25	15	41.3	1	35.99	16	14.7	3	25.49	15	29.9	0
21.3	6.55	28	79.0	7	12.09	16	41.3	0	35.82	17	14.9	2	25.33	16	29.9	0
31.3	6.27	28	79.1	1	11.92	17	41.4	1	35.64	18	15.0	1	25.17	16	30.0	1
Apr. 10.2	6.00	27	78.8	3	11.76	16	41.5	1	35.47	17	15.1	1	25.01	16	30.1	1
20.2	5.74	26	78.0	8	11.62	14	41.7	2	35.32	15	15.0	1	24.86	15	30.3	2
30.2	5.51	23	76.7	13	11.50	12	42.0	3	35.19	13	14.9	1	24.74	12	30.5	2
May 10.1	5.32	19	75.0	17	11.41	9	42.4	4	35.10	9	14.7	2	24.65	9	30.7	2
20.1	5.16	16	73.0	20	11.36	5	42.8	4	35.04	6	14.5	2	24.60	5	31.0	3
30.1	5.05	11	70.6	24	11.35	1	43.3	5	35.02	2	14.3	2	24.58	2	31.4	4
June 9.1	4.99	6	67.9	27	11.38	3	43.9	6	35.05	3	14.1	2	24.60	2	31.8	4
19.0	4.98	1	65.0	29	11.44	6	44.5	6	35.13	8	13.9	2	24.66	6	32.3	5
29.0	5.02	4	62.0	30	11.54	10	45.2	7	35.24	11	13.7	2	24.76	10	32.8	5
July 9.0	5.11	9	59.0	30	11.68	14	45.9	7	35.39	15	13.5	2	24.90	14	33.3	5
19.0	5.25	14	56.0	30	11.85	17	46.6	7	35.58	19	13.3	2	25.07	17	33.8	5
28.9	5.43	18	53.1	29	12.05	20	47.3	7	35.80	22	13.1	2	25.27	20	34.3	5
Aug. 7.9	5.66	23	50.4	27	12.28	23	48.0	7	36.05	25	13.0	1	25.50	23	34.7	4
17.9	5.92	26	48.1	23	12.53	25	48.5	5	36.32	27	12.8	2	25.75	25	35.1	4
27.8	6.21	29	46.2	19	12.80	27	48.9	4	36.61	29	12.6	2	26.02	27	35.4	3
Sept. 6.8	6.53	32	44.7	15	13.08	28	49.1	2	36.92	31	12.4	2	26.30	28	35.5	1
16.8	6.87	34	43.8	9	13.38	30	49.2	1	37.25	33	12.1	3	26.60	30	35.4	1
26.8	7.22	35	43.4	4	13.68	30	49.0	2	37.58	33	11.8	3	26.91	31	35.2	2
Oct. 6.7	7.58	36	43.6	2	13.99	31	48.6	4	37.92	34	11.4	4	27.22	31	34.8	4
16.7	7.94	36	44.5	9	14.30	31	48.1	5	38.26	34	11.0	4	27.54	32	34.3	5
26.7	8.29	35	46.0	15	14.61	31	47.4	7	38.60	34	10.5	5	27.85	31	33.6	7
Nov. 5.7	8.63	34	48.0	20	14.91	30	46.5	9	38.93	33	10.1	4	28.16	31	32.8	8
15.6	8.94	31	50.5	25	15.20	29	45.5	10	39.25	32	9.7	4	28.46	30	31.9	9
25.6	9.21	27	53.3	28	15.47	27	44.4	11	39.55	30	9.4	3	28.73	27	31.0	9
Dec. 5.6	9.44	23	56.5	32	15.72	25	43.3	11	39.82	27	9.1	3	28.98	25	30.0	10
15.5	9.62	18	59.9	34	15.93	21	42.3	10	40.05	23	8.9	2	29.20	22	29.1	9
25.5	9.75	13	63.3	34	16.10	17	41.3	10	40.24	19	8.8	1	29.38	18	28.2	9
35.5	9.82	7	66.7	34	16.23	13	40.4	9	40.39	15	8.8	0	29.52	14	27.5	7
Sec δ, Tan δ	1.370		−0.936		1.015		+0.176		1.105		+0.471		1.026		+0.231	
Mean Place	$6^s.036$		$69''.24$		$11^s.226$		$37''.19$		$34^s.818$		$5''.50$		$24^s.423$		$24''.91$	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	−0.02		−0.01		0.00		0.00		+0.01		+0.01		+0.01		0.00	
$D_\psi\,\delta$, $D_\omega\,\delta$	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ψ^5 Aurigæ.** Mag. 5.3				**α Canis Majoris.** Mag. −1.6				**18 Monocerotis.** Mag. 4.7				**43 Camelop.** Mag. 5.1			
	Right Ascension.		**Declination N.**		**Right Ascension.**		**Declination S.**		**Right Ascension.**		**Declination N.**		**Right Ascension.**		**Declination N.**	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	6 40		+43 39		6 41		−16 35		6 43		+ 2 30		6 44		+68 59	
	s		″		s		″		s		″		s		″	
Jan. 0.5	30.13		61.5		19.93		39.7		20.71		36.4		23.75		35.0	
10.5	30.26	13	62.7	12	20.00	7	42.0	23	20.81	10	35.1	13	23.94	19	37.6	26
20.4	30.33	7	64.0	13	20.02	2	44.2	22	20.86	5	34.0	11	24.01	7	40.2	26
30.4	30.33	0	65.4	14	20.00	2	46.1	19	20.86	0	33.0	10	23.95	6	42.7	25
Feb. 9.4	30.26	7	66.7	13	19.93	7	47.8	17	20.81	5	32.2	8	23.76	19	45.0	23
19.4	30.14	12	67.8	11	19.82	11	49.2	14	20.72	9	31.6	6	23.47	29	47.0	20
Mar. 1.3	29.98	16	68.7	9	19.67	15	50.2	10	20.60	12	31.2	4	23.09	38	48.7	17
11.3	29.78	20	69.4	7	19.50	17	50.9	7	20.46	14	30.9	3	22.64	45	50.0	13
21.3	29.56	22	69.9	5	19.32	18	51.3	4	20.30	16	30.8	1	22.15	49	50.7	7
31.3	29.33	23	70.1	2	19.13	19	51.4	1	20.14	16	30.8	0	21.64	51	50.9	2
Apr. 10.2	29.11	22	70.0	1	18.95	18	51.1	3	19.98	16	31.0	2	21.14	50	50.7	2
20.2	28.91	20	69.7	3	18.79	16	50.5	6	19.83	15	31.3	3	20.67	47	50.0	7
30.2	28.74	17	69.1	6	18.65	14	49.7	8	19.71	12	31.8	5	20.26	41	48.9	11
May 10.1	28.61	13	68.3	8	18.54	11	48.6	11	19.62	9	32.4	6	19.92	34	47.3	16
20.1	28.52	9	67.4	9	18.46	8	47.2	14	19.56	6	33.1	7	19.67	25	45.4	19
30.1	28.49	3	66.3	11	18.42	4	45.6	16	19.53	3	33.9	8	19.52	15	43.3	21
June 9.1	28.51	2	65.1	12	18.41	1	43.8	18	19.54	1	34.9	10	19.47	5	41.0	23
19.0	28.59	8	63.8	13	18.45	4	41.9	19	19.59	5	35.9	10	19.53	6	38.5	25
29.0	28.72	13	62.5	13	18.53	8	39.9	20	19.68	9	37.0	11	19.70	17	35.9	26
July 9.0	28.90	18	61.3	12	18.64	11	37.8	21	19.81	13	38.1	11	19.96	26	33.4	25
19.0	29.12	22	60.1	12	18.79	15	35.8	20	19.97	16	39.2	11	20.32	36	31.0	24
28.9	29.38	26	58.9	12	18.97	18	33.8	20	20.16	19	40.2	10	20.77	45	28.7	23
Aug. 7.9	29.68	30	57.8	11	19.18	21	32.0	18	20.37	21	41.2	10	21.30	53	26.5	22
17.9	30.01	33	56.8	10	19.41	23	30.5	15	20.61	24	42.1	9	21.90	60	24.6	19
27.8	30.37	36	55.9	9	19.66	25	29.3	12	20.86	25	42.7	6	22.56	66	22.9	17
Sept. 6.8	30.75	38	55.2	7	19.93	27	28.4	9	21.13	27	43.1	4	23.27	71	21.5	14
16.8	31.15	40	54.6	6	20.22	29	27.9	5	21.42	29	43.3	2	24.01	74	20.4	11
26.8	31.56	41	54.0	6	20.52	30	27.9	0	21.72	30	43.2	1	24.78	77	19.6	8
Oct. 6.7	31.98	42	53.6	4	20.82	30	28.3	4	22.02	30	42.8	4	25.57	79	19.2	4
16.7	32.40	42	53.4	2	21.13	31	29.1	8	22.32	30	42.2	6	26.37	80	19.2	0
26.7	32.81	41	53.4	0	21.43	30	30.3	12	22.62	30	41.3	9	27.16	79	19.6	4
Nov. 5.7	33.22	41	53.5	1	21.72	29	31.9	16	22.92	30	40.2	11	27.92	76	20.3	7
15.6	33.61	39	53.8	3	21.99	27	33.9	20	23.21	29	38.9	13	28.64	72	21.4	11
25.6	33.98	37	54.3	5	22.24	25	36.2	23	23.48	27	37.5	14	29.30	66	22.9	15
Dec. 5.6	34.31	33	55.0	7	22.46	22	38.6	24	23.72	24	36.0	15	29.89	59	24.7	18
15.5	34.59	28	55.9	9	22.65	19	41.1	25	23.93	21	34.5	15	30.39	50	26.8	21
25.5	34.82	23	56.9	10	22.80	15	43.6	25	24.10	17	33.0	15	30.78	39	29.1	23
35.5	35.00	18	58.1	12	22.90	10	46.0	24	24.23	13	31.6	14	31.05	27	31.6	25
Sec δ, Tan δ	1.382		+0.955		1.044		−0.298		1.001		+0.044		2.790		+2.604	
Mean Place	28ˢ.302		54″.20		18ˢ.860		46″.16		19ˢ.451		29″.37		19ˢ.896		27″.66	
$D'_\psi\ \alpha$, $D_\omega\ \alpha$	+0.02		+0.01		−0.01		0.00		0.00		0.00		+0.07		+0.03	
$D_\psi\ \delta$, $D_\omega\ \delta$	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Geminorum. Mag. 3.6				α Pictoris. Mag. 3.3				ζ Mensæ. Mag. 5.6				τ Argûs. Mag. 2.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 6 47		° ′ +34 4		h m 6 47		° ′ −61 50		h m 6 47		° ′ −80 42		h m 6 47		° ′ −50 30	
	s		″		s		″		s		″		s		″	
Jan. 0.5	5.00		8.4		20.65		43.8		26.21		73.0		48.58		31.0	
10.5	5.13	13	9.1	7	20.63	2	47.5	37	25.90	31	76.6	36	48.60	2	34.5	35
20.5	5.20	7	9.8	7	20.52	11	51.0	35	25.33	57	80.0	34	48.56	4	37.9	34
30.4	5.21	1	10.6	8	20.32	20	54.2	32	24.52	81	83.2	32	48.45	11	41.0	31
Feb. 9.4	5.17	4	11.4	8	20.04	28	57.0	28	23.50	102	86.0	28	48.28	17	43.7	27
19.4	5.08	9	12.2	8	19.70	34	59.4	24	22.30	120	88.5	25	48.05	23	46.0	23
Mar. 1.3	4.94	14	12.9	7	19.30	40	61.4	20	20.96	134	90.5	20	47.78	27	47.8	18
11.3	4.77	17	13.4	5	18.86	44	62.9	15	19.51	145	92.0	15	47.47	31	49.2	14
21.3	4.58	19	13.8	4	18.39	47	63.8	9	17.99	152	93.0	10	47.15	32	50.1	9
31.3	4.39	19	14.0	2	17.91	48	64.2	4	16.44	155	93.5	5	46.82	33	50.5	4
Apr. 10.2	4.20	19	14.0	0	17.44	47	64.1	1	14.89	155	93.4	1	46.49	33	50.3	2
20.2	4.03	17	13.9	1	16.98	46	63.5	6	13.39	150	92.9	5	46.17	32	49.6	7
30.2	3.88	15	13.6	3	16.55	43	62.3	12	11.97	142	91.9	10	45.88	29	48.5	11
May 10.2	3.77	11	13.2	4	16.17	38	60.7	16	10.66	131	90.4	15	45.63	25	46.9	16
20.1	3.70	7	12.6	6	15.85	32	58.6	21	9.49	117	88.4	20	45.43	20	44.9	20
30.1	3.67	3	12.0	6	15.59	26	56.1	25	8.48	101	86.1	23	45.27	16	42.5	24
June 9.1	3.69	2	11.3	7	15.39	20	53.3	28	7.66	82	83.4	27	45.16	11	39.8	27
19.0	3.76	7	10.6	7	15.27	12	50.3	30	7.05	61	80.5	29	45.11	5	36.9	29
29.0	3.87	11	9.8	8	15.22	5	47.1	32	6.66	39	77.4	31	45.11	0	33.8	31
July 9.0	4.02	15	9.0	8	15.25	3	43.8	33	6.50	16	74.1	33	45.17	6	30.6	32
19.0	4.21	19	8.3	7	15.36	11	40.5	33	6.57	7	70.9	32	45.29	12	27.5	31
28.9	4.44	23	7.6	7	15.54	18	37.3	32	6.87	30	67.8	31	45.46	17	24.5	30
Aug. 7.9	4.71	27	7.0	6	15.80	26	34.3	30	7.40	53	64.9	29	45.68	22	21.7	28
17.9	5.00	29	6.4	6	16.12	32	31.7	26	8.14	74	62.2	27	45.94	26	19.1	26
27.8	5.31	31	5.8	6	16.50	38	29.4	23	9.07	93	59.9	23	46.25	31	16.9	22
Sept. 6.8	5.64	33	5.2	6	16.92	42	27.6	18	10.15	108	58.1	18	46.59	34	15.2	17
16.8	5.98	34	4.7	5	17.38	46	26.4	12	11.36	121	56.8	13	46.96	37	14.1	11
26.8	6.34	36	4.2	5	17.87	49	25.8	6	12.66	130	56.1	7	47.35	39	13.6	5
Oct. 6.7	6.71	37	3.7	5	18.38	51	25.8	0	14.00	134	56.1	0	47.75	40	13.7	1
16.7	7.09	38	3.3	4	18.89	51	26.5	7	15.34	134	56.7	6	48.15	40	14.4	7
26.7	7.46	37	2.9	4	19.39	50	27.9	14	16.62	128	57.9	12	48.54	39	15.8	14
Nov. 5.7	7.82	36	2.7	2	19.86	47	29.8	19	17.80	118	59.8	19	48.92	38	17.8	20
15.6	8.17	35	2.6	1	20.28	42	32.3	25	18.83	103	62.2	24	49.27	35	20.3	25
25.6	8.50	33	2.6	0	20.65	37	35.3	30	19.67	84	65.0	28	49.58	31	23.2	29
Dec. 5.6	8.80	30	2.7	1	20.95	30	38.6	33	20.29	62	68.2	32	49.84	26	26.5	33
15.5	9.06	26	3.0	3	21.17	22	42.2	36	20.67	38	71.7	35	50.04	20	30.0	35
25.5	9.28	22	3.4	4	21.30	13	45.9	37	20.79	12	75.3	36	50.18	14	33.6	36
35.5	9.45	17	4.0	6	21.34	4	49.7	38	20.64	15	79.0	37	50.25	7	37.2	36
Sec δ, Tan δ	1.207		+0.676		2.119		−1.868		6.202		−6.121		1.572		−1.213	
Mean Place	$3^{s}.413$		$1''.61$		$18^{s}.005$		$52''.42$		$18^{s}.312$		$82''.11$		$46^{s}.631$		$39''.28$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.02		+0.01		−0.05		−0.03		−0.16		−0.08		−0.03		−0.02	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**15 Lyncis.** Mag. 4.5				**θ Canis Majoris.** Mag. 4.2				**ε Canis Majoris.** Mag. 1.6				**ζ Geminorum.** Mag. 3.7–4.3			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 6 49		° ′ +58 32		h m 6 50		° ′ −11 55		h m 6 55		° ′ −28 50		h m 6 58		° ′ +20 41	
	s		″		s		″		s		″		s		″	
Jan. 0.5	47.60	17	23.8	20	10.16	9	36.5	21	13.78	8	63.0	29	58.38	13	61.9	2
10.5	47.77	8	25.8	21	10.25	4	38.6	20	13.86	2	65.9	28	58.51	8	61.7	1
20.5	47.85	1	27.9	21	10.29	0	40.6	17	13.88	3	68.7	25	58.59	3	61.6	1
30.4	47.84	9	30.0	20	10.29	5	42.3	15	13.85	8	71.2	22	58.62	3	61.7	1
Feb. 9.4	47.75	17	32.0	17	10.24	10	43.8	12	13.77	12	73.4	18	58.59	8	61.8	2
19.4	47.58	24	33.7	14	10.14	13	45.0	9	13.65	16	75.2	15	58.51	11	62.0	2
Mar. 1.3	47.34	29	35.1	11	10.01	15	45.9	7	13.49	19	76.7	11	58.40	14	62.2	2
11.3	47.05	32	36.2	8	9.86	17	46.6	4	13.30	20	77.8	7	58.26	16	62.4	2
21.3	46.73	33	37.0	3	9.69	18	47.0	1	13.10	21	78.5	3	58.10	17	62.6	2
31.3	46.40	33	37.3	1	9.51	17	47.1	2	12.89	21	78.8	2	57.93	16	62.8	2
Apr. 10.2	46.07	31	37.2	5	9.34	16	46.9	5	12.68	20	78.6	5	57.77	15	63.0	1
20.2	45.76	26	36.7	9	9.18	14	46.4	7	12.48	18	78.1	9	57.62	13	63.1	1
30.2	45.50	21	35.8	12	9.04	11	45.7	10	12.30	15	77.2	13	57.49	11	63.2	0
May 10.2	45.29	15	34.6	15	8.93	8	44.7	12	12.15	11	75.9	16	57.38	7	63.2	0
20.1	45.14	9	33.1	17	8.85	4	43.5	14	12.04	8	74.3	19	57.31	3	63.2	0
30.1	45.05	1	31.4	19	8.81	1	42.1	16	11.96	4	72.4	22	57.28	1	63.2	0
June 9.1	45.04	6	29.5	20	8.80	3	40.5	17	11.92	0	70.2	24	57.29	5	63.2	0
19.0	45.10	13	27.5	21	8.83	7	38.8	18	11.92	5	67.8	25	57.34	9	63.2	0
29.0	45.23	20	25.4	21	8.90	11	37.0	18	11.97	8	65.3	25	57.43	13	63.2	0
July 9.0	45.43	27	23.3	20	9.01	14	35.2	18	12.05	12	62.8	25	57.56	16	63.2	0
19.0	45.70	33	21.3	19	9.15	17	33.4	18	12.17	16	60.3	25	57.72	19	63.2	0
28.9	46.03	38	19.4	18	9.32	20	31.6	16	12.33	20	57.8	23	57.91	22	63.2	0
Aug. 7.9	46.41	42	17.6	17	9.52	22	30.0	14	12.53	22	55.5	20	58.13	25	63.2	1
17.9	46.83	46	15.9	15	9.74	25	28.6	12	12.75	25	53.5	17	58.38	27	63.1	2
27.9	47.29	50	14.4	13	9.99	26	27.4	8	13.00	28	51.8	13	58.65	29	62.9	2
Sept. 6.8	47.79	53	13.1	10	10.25	28	26.6	5	13.28	29	50.5	9	58.94	30	62.7	3
16.8	48.32	55	12.1	8	10.53	29	26.1	1	13.57	31	49.6	3	59.24	32	62.4	4
26.8	48.87	56	11.3	5	10.82	30	26.0	3	13.88	32	49.3	2	59.56	33	62.0	5
Oct. 6.7	49.43	56	10.8	2	11.12	31	26.3	7	14.20	32	49.5	7	59.89	33	61.5	6
16.7	49.99	56	10.6	1	11.43	30	27.0	11	14.52	32	50.2	12	60.22	33	60.9	7
26.7	50.55	55	10.7	4	11.73	30	28.1	15	14.84	31	51.4	17	60.55	33	60.2	8
Nov. 5.7	51.10	52	11.1	7	12.03	28	29.6	17	15.15	30	53.1	22	60.88	32	59.4	7
15.6	51.62	49	11.8	10	12.31	26	31.3	20	15.45	27	55.3	25	61.20	30	58.7	7
25.6	52.11	44	12.8	13	12.57	24	33.3	22	15.72	24	57.8	28	61.50	28	58.0	6
Dec. 5.6	52.55	38	14.1	16	12.81	21	35.5	23	15.96	21	60.6	30	61.78	25	57.4	6
15.6	52.93	31	15.7	18	13.02	16	37.8	23	16.17	16	63.6	30	62.03	21	56.8	5
25.5	53.24	22	17.5	20	13.18	12	40.1	22	16.33	11	66.6	30	62.24	16	56.3	3
35.5	53.46		19.5		13.30		42.3		16.44		69.6		62.40		56.0	
Sec δ, Tan δ	1.916		+1.635		1.022		−0.211		1.142		−0.551		1.069		+0.378	
Mean Place	44ˢ.976		16″.99		8ˢ.896		43″.78		12ˢ.387		70″.95		57ˢ.005		55″.52	
D′ψ α, Dω α	+0.04		+0.03		−0.01		0.00		−0.01		−0.01		+0.01		+0.01	
Dψ δ, Dω δ	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**σ² Canis Majoris.** Mag. 3.1				**γ Canis Majoris.** Mag. 4.1				**δ Canis Majoris.** Mag. 2.0				**63 Aurigæ.** Mag. 5.1			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 6 59		° ′ −23 41		h m 6 59		° ′ −15 29		h m 7 4		° ′ −26 14		h m 7 5		° ′ +39 27	
	s		″		s		″		s		″		s		″	
Jan. 0.5	24.83		71.9		50.63		67.0		52.52		67.8		42.20		54.1	
10.5	24.92	9	74.6	27	50.73	10	69.3	23	52.61	9	70.6	28	42.36	16	55.1	10
20.5	24.96	4	77.2	26	50.78	5	71.5	22	52.65	4	73.3	27	42.46	10	56.1	10
30.4	24.94	2	79.5	23	50.77	1	73.5	20	52.64	1	75.8	25	42.49	3	57.2	11
Feb. 9.4	24.87	7	81.5	20	50.72	5	75.2	17	52.58	6	78.0	22	42.46	3	58.3	11
19.4	24.76	11	83.2	17	50.63	9	76.6	14	52.47	11	79.8	18	42.37	9	59.3	10
Mar. 1.4	24.62	14	84.6	14	50.50	13	77.7	11	52.32	15	81.3	15	42.24	13	60.3	10
11.3	24.45	17	85.6	10	50.35	15	78.5	8	52.14	18	82.4	11	42.07	17	61.1	8
21.3	24.26	19	86.2	6	50.18	17	79.0	5	51.94	20	83.1	7	41.88	19	61.7	6
31.3	24.06	20	86.5	3	50.00	18	79.2	2	51.74	20	83.5	4	41.67	21	62.1	4
Apr. 10.2	23.87	19	86.4	1	49.82	18	79.0	2	51.54	20	83.4	1	41.46	21	62.3	2
20.2	23.69	18	85.9	5	49.65	17	78.5	5	51.35	19	82.9	5	41.27	19	62.2	1
30.2	23.53	16	85.0	9	49.50	15	77.8	7	51.18	17	82.1	8	41.10	17	61.9	3
May 10.2	23.39	14	83.8	12	49.38	12	76.8	10	51.04	14	81.0	11	40.96	14	61.4	5
20.1	23.28	11	82.4	14	49.29	9	75.6	12	50.92	12	79.5	15	40.87	9	60.7	7
30.1	23.21	7	80.7	17	49.24	5	74.1	15	50.84	8	77.7	18	40.82	5	59.8	9
June 9.1	23.18	3	78.7	20	49.22	2	72.4	17	50.80	4	75.7	20	40.82	0	58.9	9
19.1	23.19	1	76.5	22	49.24	2	70.6	18	50.80	0	73.5	22	40.87	5	57.9	10
29.0	23.24	5	74.2	23	49.30	6	68.7	19	50.84	4	71.1	24	40.96	9	56.8	11
July 9.0	23.33	9	71.9	23	49.40	10	66.7	20	50.92	8	68.7	24	41.10	14	55.7	11
19.0	23.45	12	69.6	23	49.53	13	64.7	20	51.04	12	66.3	24	41.28	18	54.6	11
28.9	23.61	16	67.4	22	49.69	16	62.8	19	51.19	15	63.9	24	41.50	22	53.5	11
Aug. 7.9	23.80	19	65.3	21	49.88	19	61.0	18	51.37	18	61.7	22	41.76	26	52.4	11
17.9	24.02	22	63.4	19	50.09	21	59.5	15	51.58	21	59.8	19	42.05	29	51.4	10
27.9	24.26	24	61.8	16	50.33	24	58.2	13	51.82	24	58.2	16	42.36	31	50.4	10
Sept. 6.8	24.52	26	60.6	12	50.59	26	57.2	10	52.09	27	56.9	13	42.70	34	49.5	9
16.8	24.80	28	59.8	8	50.87	28	56.6	6	52.38	29	56.0	9	43.06	36	48.7	8
26.8	25.10	30	59.5	3	51.16	29	56.5	1	52.68	30	55.6	4	43.44	38	47.9	8
Oct. 6.8	25.41	31	59.7	2	51.46	30	56.8	3	52.99	31	55.8	2	43.83	39	47.2	7
16.7	25.73	32	60.4	7	51.77	31	57.5	7	53.31	32	56.5	7	44.23	40	46.6	6
26.7	26.04	31	61.6	12	52.08	31	58.6	11	53.63	32	57.7	12	44.63	40	46.2	4
Nov. 5.7	26.35	31	63.3	17	52.38	30	60.1	15	53.94	31	59.3	16	45.03	40	45.9	3
15.6	26.64	29	65.3	20	52.67	29	62.0	19	54.24	30	61.4	21	45.41	38	45.8	1
25.6	26.91	27	67.7	24	52.94	27	64.1	21	54.52	28	63.8	24	45.77	36	45.8	0
Dec. 5.6	27.16	25	70.3	26	53.18	24	66.4	23	54.77	25	66.5	27	46.11	34	46.1	3
15.6	27.37	21	73.1	28	53.39	21	68.8	24	54.98	21	69.4	29	46.41	30	46.6	5
25.5	27.53	16	75.9	28	53.56	17	71.3	25	55.15	17	72.3	29	46.66	25	47.2	6
35.5	27.65	12	78.7	28	53.69	13	73.8	25	55.28	13	75.2	29	46.86	20	48.0	8
Sec δ, Tan δ	1.092		−0.439		1.038		−0.277		1.115		−0.493		1.295		+0.823	
Mean Place	23ˢ.501		79″.73		49ˢ.361		74″.52		51ˢ.179		75″.97		40ˢ.459		48″.41	
D′ψ α, Dω α	−0.01		−0.01		−0.01		0.00		−0.01		−0.01		+0.02		+0.02	
Dψ δ, Dω δ	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**51 Geminorum.** Mag. 5.3				**γ^2 Volantis.** Mag. 3.9				**25 H. Camelop.** Mag. 5.1				**λ Geminorum.** Mag. 3.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	7 8		+16 18		7 9		−70 21		7 12		+82 34		7 13		+16 41	
	s		″		s		″		s		″		s		″	
Jan. 0.5	23.96		32.9		32.84		17.5		62.33		60.5		7.01		59.2	
10.5	24.10	14	32.4	5	32.82	2	21.3	38	62.89	56	63.5	30	7.15	14	58.7	5
20.5	24.18	8	32.0	4	32.68	14	25.0	37	63.10	21	66.6	31	7.24	9	58.3	4
30.4	24.21	3	31.8	2	32.41	27	28.4	34	62.97	13	69.6	30	7.27	3	58.1	2
Feb. 9.4	24.19	2	31.7	1	32.03	38	31.5	31	62.50	47	72.4	28	7.26	1	58.0	1
19.4	24.13	6	31.7	0	31.55	48	34.2	27	61.72	78	75.0	26	7.20	6	58.0	0
Mar. 1.4	24.03	10	31.8	1	30.99	56	36.5	23	60.68	104	77.2	22	7.10	10	58.1	1
11.3	23.90	13	31.9	1	30.37	62	38.4	19	59.43	125	78.9	17	6.97	13	58.2	1
21.3	23.74	16	32.0	1	29.70	67	39.7	13	58.02	141	80.1	12	6.82	15	58.4	2
31.3	23.57	17	32.2	2	29.01	69	40.5	8	56.52	150	80.7	6	6.66	16	58.6	2
Apr. 10.2	23.41	16	32.4	2	28.32	69	40.8	3	55.01	151	80.8	1	6.49	17	58.8	2
20.2	23.26	15	32.6	2	27.64	68	40.6	2	53.54	147	80.3	5	6.33	16	59.0	2
30.2	23.13	13	32.8	2	26.99	65	39.8	8	52.18	136	79.2	11	6.20	13	59.1	1
May 10.2	23.02	11	32.9	1	26.39	60	38.5	13	50.98	120	77.6	16	6.09	11	59.3	2
20.1	22.95	7	33.1	2	25.85	54	36.7	18	49.98	100	75.6	20	6.02	7	59.5	2
30.1	22.91	4	33.3	2	25.39	46	34.5	22	49.21	77	73.2	24	5.98	4	59.7	2
June 9.1	22.91	0	33.5	2	25.02	37	32.0	25	48.71	50	70.5	27	5.97	1	59.9	2
19.1	22.95	4	33.7	2	24.74	28	29.2	28	48.49	22	67.6	29	6.01	4	60.1	2
29.0	23.03	8	34.0	3	24.57	17	26.1	31	48.55	6	64.6	30	6.09	8	60.3	2
July 9.0	23.15	12	34.2	2	24.50	7	22.9	32	48.90	35	61.5	31	6.20	11	60.5	2
19.0	23.30	15	34.4	2	24.54	4	19.6	33	49.53	63	58.5	30	6.35	15	60.7	2
28.9	23.48	18	34.6	2	24.69	15	16.4	32	50.42	89	55.5	30	6.52	17	60.8	1
Aug. 7.9	23.69	21	34.8	2	24.94	25	13.3	31	51.55	113	52.7	28	6.72	20	60.9	1
17.9	23.92	23	34.9	1	25.29	35	10.4	29	52.91	136	50.1	26	6.95	23	61.0	1
27.9	24.17	25	34.9	0	25.74	45	7.9	25	54.47	156	47.7	24	7.20	25	60.9	1
Sept. 6.8	24.44	27	34.7	2	26.27	53	5.9	20	56.20	173	45.7	20	7.47	27	60.7	2
16.8	24.73	29	34.4	3	26.86	59	4.4	15	58.07	187	44.1	16	7.76	29	60.4	3
26.8	25.04	31	34.0	4	27 50	64	3.5	9	60.04	197	42.8	13	8.07	31	60.0	4
Oct. 6.8	25.36	32	33.5	5	28.18	68	3.2	3	62.09	205	41.9	9	8.38	31	59.4	6
16.7	25.68	32	32.8	7	28.87	69	3.6	4	64.18	209	41.5	4	8.70	32	58.7	7
26.7	26.01	33	32.0	8	29.55	68	4.7	11	66.26	208	41.6	1	9.03	33	57.9	8
Nov. 5.7	26.33	32	31.1	9	30.20	65	6.4	17	68.29	203	42.2	6	9.36	33	57.0	9
15.6	26.65	32	30.1	10	30.79	59	8.7	23	70.23	194	43.2	10	9.68	32	56.0	10
25.6	26.95	30	29.2	9	31.31	52	11.5	28	72.02	179	44.7	15	9.99	31	55.0	10
Dec. 5.6	27.23	28	28.3	9	31.73	42	14.7	32	73.62	160	46.7	20	10.27	28	54.1	9
15.6	27.47	24	27.4	9	32.04	31	18.2	35	74.98	136	49.0	23	10.52	25	53.3	8
25.5	27.68	21	26.7	7	32.23	19	21.9	37	76.06	108	51.6	26	10.73	21	52.5	8
35.5	27.85	17	26.0	7	32.30	7	25.7	38	76.83	77	54.5	29	10.90	17	51.8	7
Sec δ, Tan δ	1.042		+0.293		2.974		−2.801		7.747		+7.682		1.044		+0.300	
Mean Place	$22^{s}.625$		$26''.75$		$29^{s}.285$		$28''.07$		$50^{s}.993$		$55''.51$		$5^{s}.670$		$53''.17$	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	+0.01		+0.01		−0.07		−0.06		+0.19		+0.16		+0.01		+0.01	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**π Argûs.** Mag. 2.7				**δ Geminorum.** Mag. 3.5				**δ Volantis.** Mag. 4.0				**ι Geminorum.** Mag. 3.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 7 14		° ′ −36 56		h m 7 14		° ′ +22 8		h m 7 16		° ′ −67 47		h m 7 20		° ′ +27 58	
	s		″		s		″		s		″		s		″	
Jan. 0.5	5.68	9	18.3	33	57.14	15	41.9	1	56.13	2	42.0	37	21.00	16	23.9	2
10.5	5.77	3	21.6	31	57.29	9	41.8	1	56.15	9	45.7	37	21.16	11	24.1	3
20.5	5.80	3	24.7	29	57.38	4	41.7	1	56.06	21	49.4	35	21.27	5	24.4	5
30.4	5.77	8	27.6	26	57.42	1	41.8	2	55.85	31	52.9	32	21.32	1	24.9	5
Feb. 9.4	5.69	13	30.2	23	57.41	6	42.0	3	55.54	40	56.1	28	21.31	6	25.4	5
19.4	5.56	17	32.5	19	57.35	10	42.3	3	55.14	47	58.9	24	21.25	10	25.9	6
Mar. 1.4	5.39	21	34.4	14	57.25	13	42.6	3	54.67	53	61.3	20	21.15	14	26.5	5
11.3	5.18	23	35.8	10	57.12	16	42.9	3	54.14	58	63.3	14	21.01	16	27.0	5
21.3	4.95	24	36.8	6	56.96	17	43.2	3	53.56	60	64.7	9	20.85	17	27.5	4
31.3	4.71	24	37.4	1	56.79	16	43.5	2	52.96	61	65.6	4	20.68	18	27.9	2
Apr. 10.3	4.47	23	37.5	4	56.63	16	43.7	1	52.35	60	66.0	1	20.50	17	28.1	1
20.2	4.24	21	37.1	8	56.47	14	43.8	1	51.75	57	65.9	7	20.33	15	28.2	0
30.2	4.03	18	36.3	12	56.33	11	43.9	1	51.18	53	65.2	12	20.18	12	28.2	1
May 10.2	3.85	15	35.1	16	56.22	8	44.0	0	50.65	47	64.0	17	20.06	9	28.1	2
20.1	3.70	12	33.5	19	56.14	5	44.0	1	50.18	40	62.3	21	19.97	5	27.9	3
30.1	3.58	8	31.6	22	56.09	0	43.9	1	49.78	33	60.2	25	19.92	1	27.6	4
June 9.1	3.50	3	29.4	25	56.09	4	43.8	1	49.45	25	57.7	28	19.91	4	27.2	4
19.1	3.47	1	26.9	27	56.13	7	43.7	1	49.20	16	54.9	30	19.95	7	26.8	4
29.0	3.48	5	24.2	28	56.20	11	43.6	1	49.04	6	51.9	32	20.02	11	26.4	5
July 9.0	3.53	10	21.4	27	56.31	15	43.5	1	48.98	4	48.7	33	20.13	15	25.9	5
19.0	3.63	14	18.7	27	56.46	18	43.4	2	49.02	13	45.4	32	20.28	18	25.4	5
29.0	3.77	18	16.0	26	56.64	21	43.2	2	49.15	22	42.2	31	20.46	22	24.9	6
Aug. 7.9	3.95	21	13.4	23	56.85	24	43.0	3	49.37	31	39.1	29	20.68	24	24.3	6
17.9	4.16	24	11.1	20	57.09	26	42.7	3	49.68	39	36.2	25	20.92	27	23.7	6
27.9	4.40	27	9.1	16	57.35	28	42.4	4	50.07	46	33.7	21	21.19	29	23.1	6
Sept. 6.8	4.67	30	7.5	11	57.63	30	42.0	5	50.53	53	31.6	16	21.48	31	22.5	7
16.8	4.97	32	6.4	6	57.93	31	41.5	5	51.06	58	30.0	10	21.79	33	21.8	7
26.8	5.29	34	5.8	0	58.24	33	41.0	6	51.64	61	29.0	3	22.12	34	21.1	8
Oct. 6.8	5.63	34	5.8	6	58.57	33	40.4	7	52.25	62	28.7	3	22.46	35	20.3	8
16.7	5.97	34	6.4	11	58.90	34	39.7	8	52.87	62	29.0	10	22.81	35	19.5	7
26.7	6.31	34	7.5	17	59.24	34	38.9	8	53.49	59	30.0	17	23.16	35	18.8	7
Nov. 5.7	6.65	33	9.2	22	59.58	33	38.1	8	54.08	55	31.7	22	23.51	35	18.1	6
15.7	6.98	30	11.4	26	59.91	32	37.3	8	54.63	49	33.9	27	23.86	34	17.5	6
25.6	7.28	27	14.0	29	60.23	29	36.5	7	55.12	40	36.6	32	24.20	31	16.9	4
Dec. 5.6	7.55	22	16.9	32	60.52	26	35.8	6	55.52	31	39.8	35	24.51	28	16.5	3
15.6	7.77	18	20.1	33	60.78	22	35.2	4	55.83	21	43.3	37	24.79	24	16.2	1
25.5	7.95	13	23.4	34	61.00	19	34.8	3	56.04	10	47.0	38	25.03	19	16.1	0
35.5	8.08		26.8		61.19		34.5		56.14		50.8		25.22		16.1	
Sec δ, Tan δ	1.251		−0.752		1.080		+0.407		2.646		−2.450		1.132		+0.531	
Mean Place	$4^{s}.205$		$27''.42$		$55^{s}.739$		$36''.20$		$53^{s}.036$		$52''.92$		$19^{s}.517$		$18''.72$	
$D'_\psi\, \alpha$, $D_\omega\, \alpha$	−0.02		−0.02		+0.01		+0.01		−0.06		−0.05		+0.01		+0.01	
$D_\psi\, \delta$, $D_\omega\, \delta$	−0.1		+0.9		−0.1		+0.9		−0.1		+0.9		−0.1		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	η Canis Majoris. Mag. 2.4				Groombridge 1308. Mag. 5.8				β Canis Minoris. Mag. 3.1				ρ Geminorum. Mag. 4.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 7 20 s		° ′ −29 7 ″		h m 7 21 s		° ′ +68 38 ″		h m 7 22 s		° ′ + 8 27 ″		h m 7 23 s		° ′ +31 57 ″	
Jan. 0.5	40.62		49.1		54.37		45.2		27.29		61.6		32.63		35.7	
10.5	40.72	10	52.1	30	54.66	29	47.7	25	27.44	15	60.5	11	32.80	17	36.1	4
20.5	40.77	5	55.0	29	54.82	16	50.2	25	27.53	9	59.6	9	32.91	11	36.6	5
30.4	40.77	0	57.7	27	54.85	3	52.7	25	27.57	4	58.9	7	32.96	5	37.3	7
Feb. 9.4	40.72	5	60.1	24	54.76	9	55.2	25	27.56	1	58.3	6	32.96	0	38.1	8
19.4	40.62	10	62.1	20	54.55	21	57.5	23	27.51	5	57.9	4	32.90	6	38.9	8
Mar. 1.4	40.48	14	63.8	17	54.24	31	59.5	20	27.42	9	57.6	3	32.80	10	39.6	7
11.3	40.30	18	65.1	13	53.85	39	61.1	16	27.29	13	57.5	1	32.66	14	40.3	7
21.3	40.10	20	66.0	9	53.40	45	62.3	12	27.14	15	57.5	0	32.49	17	40.9	6
31.3	39.90	20	66.5	5	52.92	48	63.0	7	26.98	16	57.6	1	32.30	19	41.3	4
Apr. 10.3	39.69	21	66.6	1	52.42	50	63.2	2	26.83	15	57.8	2	32.12	18	41.6	3
20.2	39.49	20	66.3	3	51.94	48	63.0	2	26.68	15	58.0	2	31.95	17	41.7	1
30.2	39.30	19	65.6	7	51.50	44	62.3	7	26.54	14	58.3	3	31.79	16	41.7	0
May 10.2	39.14	16	64.6	10	51.12	38	61.1	12	26.43	11	58.7	4	31.66	13	41.5	2
20.1	39.01	13	63.2	14	50.81	31	59.5	16	26.35	8	59.2	5	31.57	9	41.2	3
30.1	38.92	9	61.4	18	50.58	23	57.6	19	26.30	5	59.7	5	31.51	6	40.7	5
June 9.1	38.86	6	59.4	20	50.45	13	55.4	22	26.29	1	60.3	6	31.50	1	40.1	6
19.1	38.84	2	57.2	22	50.42	3	53.0	24	26.32	3	60.9	6	31.53	3	39.5	6
29.0	38.86	2	54.8	24	50.49	7	50.5	25	26.38	6	61.6	7	31.60	7	38.8	7
July 9.0	38.92	6	52.3	25	50.65	16	47.9	26	26.47	9	62.2	6	31.71	11	38.1	7
19.0	39.02	10	49.8	25	50.91	26	45.3	26	26.60	13	62.8	6	31.86	15	37.4	7
29.0	39.15	13	47.4	24	51.26	35	42.7	26	26.76	16	63.4	6	32.05	19	36.6	8
Aug. 7.9	39.32	17	45.1	23	51.70	44	40.2	25	26.94	18	63.9	5	32.27	22	35.8	8
17.9	39.52	20	43.0	21	52.21	51	37.9	23	27.15	21	64.3	4	32.52	25	35.1	7
27.9	39.75	23	41.2	18	52.79	58	35.8	21	27.38	23	64.6	3	32.79	27	34.3	8
Sept. 6.8	40.00	25	39.8	14	53.43	64	33.9	19	27.64	26	64.7	1	33.09	30	33.4	9
16.8	40.28	28	38.9	9	54.12	69	32.2	17	27.92	28	64.6	1	33.41	32	32.6	8
26.8	40.58	30	38.4	5	54.85	73	30.9	13	28.21	29	64.3	3	33.75	34	31.8	8
Oct. 6.8	40.90	32	38.4	0	55.61	76	29.9	10	28.51	30	63.8	5	34.11	36	31.0	8
16.7	41.22	32	39.0	6	56.39	78	29.3	6	28.82	31	63.0	8	34.47	36	30.2	8
26.7	41.55	33	40.1	11	57.17	78	29.1	2	29.14	32	62.0	10	34.84	37	29.5	7
Nov. 5.7	41.88	33	41.7	16	57.95	78	29.2	1	29.45	31	60.9	11	35.21	37	28.8	7
15.7	42.19	31	43.8	21	58.70	75	29.7	5	29.76	31	59.7	12	35.57	36	28.3	5
25.6	42.48	29	46.2	24	59.41	71	30.7	10	30.06	30	58.4	13	35.92	35	27.9	4
Dec. 5.6	42.74	26	48.9	27	60.06	65	32.1	14	30.34	28	57.0	14	36.24	32	27.6	3
15.6	42.97	23	51.9	30	60.63	57	33.8	17	30.59	25	55.6	14	36.53	29	27.5	1
25.5	43.16	19	55.0	31	61.10	47	35.9	21	30.80	21	54.3	13	36.78	25	27.6	1
35.5	43.30	14	58.1	31	61.46	36	38.2	23	30.97	17	53.2	11	36.99	21	27.9	3
Sec δ, Tan δ	1.145		−0.557		2.746		+2.558		1.011		+0.149		1.179		+0.624	
Mean Place	$39^{s}.276$		$57''.97$		$50^{s}.412$		$41''.17$		$26^{s}.027$		$55''.37$		$31^{s}.063$		$30''.82$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.01		−0.01		+0.06		+0.06		0.00		0.00		+0.02		+0.01	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.1		+0.9		−0.1		+0.9		−0.1		+0.9		−0.1		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**σ Argûs.** Mag. 3.3				**α² Geminorum.** Mag. 2.0				**25 Monocerotis.** Mag. 5.2				**α Canis Minoris.** Mag. 0.5			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 7 26		° ′ −43 7		h m 7 29		° ′ +32 4		h m 7 32		° ′ − 3 54		h m 7 34		° ′ + 5 26	
	s		″		s		″		s		″		s		″	
Jan. 0.5	29.75		19.2		4.64		54.3		58.34		50.4		46.10		60.2	
10.5	29.85	10	22.7	35	4.81	17	54.7	4	58.48	14	52.2	18	46.24	14	58.9	13
20.5	29.88	3	26.0	33	4.93	12	55.3	6	58.57	9	53.9	17	46.34	10	57.8	11
30.5	29.85	3	29.1	31	4.99	6	56.0	7	58.61	4	55.4	15	46.39	5	56.9	9
Feb. 9.4	29.76	9	32.0	29	4.99	0	56.7	7	58.60	1	56.7	13	46.39	0	56.1	8
19.4	29.62	14	34.6	26	4.94	5	57.5	8	58.55	5	57.7	10	46.34	5	55.5	6
Mar. 1.4	29.43	19	36.8	22	4.84	10	58.3	8	58.46	9	58.5	8	46.25	9	55.1	4
11.3	29.21	22	38.5	17	4.70	14	59.0	7	58.34	12	59.1	6	46.13	12	54.9	2
21.3	28.96	25	39.7	12	4.53	17	59.6	6	58.20	14	59.4	3	45.99	14	54.8	1
31.3	28.69	27	40.4	7	4.35	18	60.1	5	58.04	16	59.5	1	45.83	16	54.8	0
Apr. 10.3	28.42	27	40.7	3	4.17	18	60.4	3	57.88	16	59.4	1	45.67	16	54.9	1
20.2	28.16	26	40.5	2	3.99	18	60.5	1	57.72	16	59.2	2	45.52	15	55.1	2
30.2	27.92	24	39.8	7	3.83	16	60.5	0	57.58	14	58.8	4	45.38	14	55.5	4
May 10.2	27.70	22	38.7	11	3.70	13	60.3	2	57.46	12	58.2	6	45.27	11	56.0	5
20.2	27.51	19	37.2	15	3.60	10	60.0	3	57.37	9	57.4	8	45.18	9	56.5	5
30.1	27.36	15	35.3	19	3.54	6	59.6	4	57.31	6	56.4	10	45.12	6	57.1	6
June 9.1	27.25	11	33.0	23	3.52	2	59.0	6	57.28	3	55.3	11	45.10	2	57.7	6
19.1	27.18	7	30.5	25	3.54	2	58.3	7	57.29	1	54.1	12	45.12	2	58.4	7
29.0	27.16	2	27.8	27	3.60	6	57.6	7	57.33	4	52.9	12	45.17	5	59.2	8
July 9.0	27.19	3	24.9	29	3.71	11	56.9	7	57.40	7	51.6	13	45.25	8	60.0	8
19.0	27.26	7	22.0	29	3.86	15	56.1	8	57.51	11	50.3	13	45.36	11	60.7	7
29.0	27.38	12	19.1	29	4.04	18	55.3	8	57.65	14	49.0	13	45.51	15	61.4	7
Aug. 7.9	27.54	16	16.3	28	4.25	21	54.5	8	57.82	17	47.9	11	45.69	18	62.0	6
17.9	27.75	21	13.8	25	4.49	24	53.7	8	58.01	19	46.9	10	45.89	20	62.5	5
27.9	28.00	25	11.6	22	4.76	27	52.8	9	58.23	22	46.1	8	46.11	22	62.8	3
Sept. 6.9	28.28	28	9.8	18	5.06	30	52.0	8	58.47	24	45.5	6	46.35	24	62.9	1
16.8	28.59	31	8.5	13	5.38	32	51.1	9	58.73	26	45.2	3	46.61	26	62.8	1
26.8	28.92	33	7.7	8	5.71	33	50.2	9	59.01	28	45.3	1	46.89	28	62.5	3
Oct. 6.8	29.27	35	7.5	2	6.06	35	49.3	9	59.30	29	45.7	4	47.19	30	61.9	6
16.7	29.64	37	7.9	4	6.42	36	48.5	8	59.60	30	46.4	7	47.50	31	61.1	8
26.7	30.01	37	9.0	11	6.79	37	47.7	8	59.91	31	47.4	10	47.81	31	60.0	11
Nov. 5.7	30.37	36	10.6	16	7.16	37	47.0	7	60.22	31	48.8	14	48.12	31	58.8	12
15.7	30.72	35	12.7	21	7.52	36	46.4	6	60.53	31	50.4	16	48.43	31	57.4	14
25.6	31.05	33	15.3	26	7.87	35	45.9	5	60.82	29	52.2	18	48.73	30	55.9	15
Dec. 5.6	31.34	29	18.3	30	8.20	33	45.6	3	61.09	27	54.1	19	49.01	28	54.3	16
15.6	31.58	24	21.6	33	8.50	30	45.5	1	61.34	25	56.1	20	49.26	25	52.7	16
25.6	31.78	20	25.1	35	8.76	26	45.6	1	61.55	21	58.1	20	49.48	22	51.2	15
35.5	31.92	14	28.6	35	8.97	21	45.8	2	61.72	17	60.0	19	49.65	17	49.8	14
Sec δ, Tan δ	1.370		−0.937		1.180		+0.627		1.002		−0.068		1.005		+0.095	
Mean Place	28ˢ.193		29″.25		3ˢ.069		49″.81		57ˢ.136		57″.37		44ˢ.907		54″.76	
D′ψ α, Dω α	−0.02		−0.02		+0.02		+0.02		0.00		0.00		0.00		0.00	
Dψ δ, Dω δ	−0.1		+0.9		−0.2		+0.9		−0.2		+0.9		−0.2		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**24 Lyncis.** Mag. 5.0				**κ Geminorum.** Mag. 3.7				**β Geminorum.** Mag. 1.2				**4 Puppis.** Mag. 5.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 7 35		° ′ +58 54		h m 7 39		° ′ +24 36		h m 7 39		° ′ +28 14		h m 7 41		° ′ −14 20	
	s		″		s		″		s		″		s		″	
Jan. 0.5	41.96		57.2		13.30		31.1		61.15		17.9		57.70		58.0	
10.5	42.21	25	59.1	19	13.47	17	31.0	1	61.33	18	18.0	1	57.84	14	60.4	24
20.5	42.38	17	61.2	21	13.59	12	31.0	0	61.46	13	18.3	3	57.93	9	62.7	23
30.5	42.46	8	63.3	21	13.66	7	31.2	2	61.53	7	18.7	4	57.97	4	64.8	21
Feb. 9.4	42.44	2	65.4	21	13.67	1	31.6	4	61.54	1	19.3	6	57.96	1	66.6	18
19.4	42.33	11	67.4	20	13.63	4	32.0	4	61.50	4	19.9	6	57.91	5	68.2	16
Mar. 1.4	42.15	18	69.2	18	13.55	8	32.5	5	61.41	9	20.6	7	57.81	10	69.5	13
11.4	41.90	25	70.8	16	13.43	12	33.0	5	61.28	13	21.2	6	57.68	13	70.5	10
21.3	41.61	29	72.0	12	13.28	15	33.4	4	61.13	15	21.7	5	57.53	15	71.2	7
31.3	41.29	32	72.8	8	13.12	16	33.8	4	60.96	17	22.2	5	57.37	16	71.6	4
Apr. 10.3	40.96	33	73.2	4	12.95	17	34.1	3	60.79	17	22.6	4	57.20	17	71.7	1
20.2	40.64	32	73.2	0	12.78	17	34.4	3	60.62	17	22.8	2	57.03	17	71.5	2
30.2	40.34	30	72.8	4	12.63	15	34.5	1	60.46	16	22.9	1	56.87	16	71.0	5
May 10.2	40.08	26	72.0	8	12.51	12	34.6	1	60.33	13	22.9	0	56.74	13	70.2	8
20.2	39.87	21	70.9	11	12.42	9	34.5	1	60.23	10	22.7	2	56.63	11	69.2	10
30.1	39.72	15	69.4	15	12.36	6	34.4	1	60.17	6	22.4	3	56.55	8	68.0	12
June 9.1	39.63	9	67.7	17	12.34	2	34.2	2	60.14	3	22.1	3	56.51	4	66.6	14
19.1	39.61	2	65.8	19	12.35	1	34.0	2	60.15	1	21.7	4	56.50	1	65.0	16
29.0	39.66	5	63.7	21	12.40	5	33.7	3	60.20	5	21.2	5	56.52	2	63.3	17
July 9.0	39.78	12	61.5	22	12.49	9	33.4	3	60.29	9	20.6	6	56.58	6	61.5	18
19.0	39.96	18	59.2	23	12.62	13	33.0	4	60.42	13	20.0	6	56.67	9	59.7	18
29.0	40.21	25	57.0	22	12.78	16	32.6	4	60.58	16	19.4	6	56.79	12	58.0	17
Aug. 7.9	40.52	31	54.8	22	12.97	19	32.1	5	60.77	19	18.8	6	56.94	15	56.3	17
17.9	40.88	36	52.7	21	13.19	22	31.6	5	60.99	22	18.1	7	57.12	18	54.8	15
27.9	41.28	40	50.7	20	13.43	24	31.0	6	61.24	25	17.3	8	57.33	21	53.6	12
Sept. 6.9	41.73	45	48.9	18	13.70	27	30.4	6	61.52	28	16.5	8	57.56	23	52.6	10
16.8	42.22	49	47.2	17	13.99	29	29.7	7	61.82	30	15.7	8	57.82	26	52.0	6
26.8	42.74	52	45.8	14	14.30	31	28.9	8	62.14	32	14.8	9	58.10	28	51.8	2
Oct. 6.8	43.28	54	44.6	12	14.62	32	28.0	9	62.47	33	13.8	10	58.39	29	52.0	2
16.7	43.84	56	43.7	9	14.96	34	27.1	9	62.82	35	12.9	9	58.69	30	52.6	6
26.7	44.41	57	43.1	6	15.30	34	26.2	9	63.17	35	12.0	9	59.00	31	53.7	11
Nov. 5.7	44.98	57	42.9	2	15.65	35	25.2	10	63.53	36	11.1	9	59.31	31	55.1	14
15.7	45.54	56	43.0	1	16.00	35	24.3	9	63.89	36	10.3	8	59.62	31	56.9	18
25.6	46.08	54	43.5	5	16.33	33	23.5	8	64.23	34	9.6	7	59.92	30	59.0	21
Dec. 5.6	46.58	50	44.3	8	16.65	32	22.7	8	64.55	32	9.0	6	60.20	28	61.3	23
15.6	47.03	45	45.4	11	16.94	29	22.1	6	64.85	30	8.6	4	60.45	25	63.7	24
25.6	47.42	39	46.9	15	17.19	25	21.7	4	65.11	26	8.4	2	60.66	21	66.2	25
35.5	47.73	31	48.7	18	17.40	21	21.5	2	65.32	21	8.4	0	60.83	17	68.7	25
Sec δ, Tan δ	1.937		+1.659		1.100		+0.458		1.135		+0.537		1.032		−0.256	
Mean Place	$39^s.203$		$54''.27$		$11^s.869$		$26''.61$		$59^s.666$		$13''.77$		$56^s.508$		$66''.05$	
$D'_\psi a$, $D_\omega a$	+0.04		+0.04		+0.01		+0.01		+0.01		+0.02		−0.01		−0.01	
$D_\psi \delta$, $D_\omega \delta$	−0.2		+0.9		−0.2		+0.9		−0.2		+0.9		−0.2		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ξ Argûs.** Mag. 3.5				**φ Geminorum.** Mag. 5.0				**26 Lyncis.** Mag. 5.7				**Groombridge 1374.** Mag. 5.6			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	7 45		−24 38		7 48		+26 59		7 48		+47 47		7 49		+74 8	
	s		″		s		″		s		″		s		″	
Jan. 0.5	39.35		17.7		11.99		34.6		25.07		30.4		53.72		68.1	
		14		29		19		0		23		12		45		25
10.5	39.49		20.6		12.18		34.6		25.30		31.6		54.17		70.6	
		8		28		13		2		16		14		28		27
20.5	39.57		23.4		12.31		34.8		25.46		33.0		54.45		73.3	
		3		26		8		3		9		16		11		28
30.5	39.60		26.0		12.39		35.1		25.55		34.6		54.56		76.1	
		2		24		2		5		2		16		6		27
Feb. 9.4	39.58		28.4		12.41		35.6		25.57		36.2		54.50		78.8	
		7		20		3		6		5		16		22		26
19.4	39.51		30.4		12.38		36.2		25.52		37.8		54.28		81.4	
		11		17		8		6		11		15		36		24
Mar. 1.4	39.40		32.1		12.30		36.8		25.41		39.3		53.92		83.8	
		14		14		12		6		17		13		48		20
11.4	39.26		33.5		12.18		37.4		25.24		40.6		53.44		85.8	
		17		10		15		5		20		11		58		15
21.3	39.09		34.5		12.03		37.9		25.04		41.7		52.86		87.3	
		18		6		16		5		23		9		64		11
31.3	38.91		35.1		11.87		38.4		24.81		42.6		52.22		88.4	
		19		3		17		4		24		5		67		6
Apr. 10.3	38.72		35.4		11.70		38.8		24.57		43.1		51.55		89.0	
		19		1		17		3		24		2		67		0
20.2	38.53		35.3		11.53		39.1		24.33		43.3		50.88		89.0	
		18		5		15		1		22		1		64		5
30.2	38.35		34.8		11.38		39.2		24.11		43.2		50.24		88.5	
		15		8		13		0		19		4		58		10
May 10.2	38.20		34.0		11.25		39.2		23.92		42.8		49.66		87.5	
		13		12		10		1		15		8		50		14
20.2	38.07		32.8		11.15		39.1		23.77		42.0		49.16		86.1	
		10		15		7		1		11		10		40		19
30.1	37.97		31.3		11.08		39.0		23.66		41.0		48.76		84.2	
		7		17		3		3		6		12		29		22
June 9.1	37.90		29.6		11.05		38.7		23.60		39.8		48.47		82.0	
		3		19		1		4		1		14		16		25
19.1	37.87		27.7		11.06		38.3		23.59		38.4		48.31		79.5	
		1		21		4		4		4		15		4		27
29.1	37.88		25.6		11.10		37.9		23.63		36.9		48.27		76.8	
		4		22		8		5		9		16		9		28
July 9.0	37.92		23.4		11.18		37.4		23.72		35.3		48.36		74.0	
		7		22		12		5		14		17		22		29
19.0	37.99		21.2		11.30		36.9		23.86		33.6		48.58		71.1	
		11		22		15		6		19		17		34		29
29.0	38.10		19.0		11.45		36.3		24.05		31.9		48.92		68.2	
		15		21		18		6		23		18		46		29
Aug. 7.9	38.25		16.9		11.63		35.7		24.28		30.1		49.38		65.3	
		18		19		22		7		27		17		57		28
17.9	38.43		15.0		11.85		35.0		24.55		28.4		49.95		62.5	
		21		17		24		7		31		17		67		26
27.9	38.64		13.3		12.09		34.3		24.86		26.7		50.62		59.9	
		23		14		27		8		34		16		76		23
Sept. 6.9	38.87		11.9		12.36		33.5		25.20		25.1		51.38		57.6	
		26		9		29		9		37		15		84		21
16.8	39.13		11.0		12.65		32.6		25.57		23.6		52.22		55.5	
		28		5		31		9		40		14		90		18
26.8	39.41		10.5		12.96		31.7		25.97		22.2		53.12		53.7	
		30		0		33		10		43		13		96		15
Oct. 6.8	39.71		10.5		13.29		30.7		26.40		20.9		54.08		52.2	
		31		5		34		10		44		11		100		10
16.8	40.02		11.0		13.63		29.7		26.84		19.8		55.08		51.2	
		32		10		35		10		45		9		101		6
26.7	40.34		12.0		13.98		28.7		27.29		18.9		56.09		50.6	
		33		15		36		10		46		6		102		2
Nov. 5.7	40.67		13.5		14.34		27.7		27.75		18.3		57.11		50.4	
		32		19		35		9		45		3		100		3
15.7	40.99		15.4		14.69		26.8		28.20		18.0		58.11		50.7	
		31		22		35		8		44		1		96		7
25.6	41.30		17.6		15.04		26.0		28.64		17.9		59.07		51.4	
		28		26		33		7		41		2		88		12
Dec. 5.6	41.58		20.2		15.37		25.3		29.05		18.1		59.95		52.6	
		25		28		30		5		38		5		79		16
15.6	41.83		23.0		15.67		24.8		29.43		18.6		60.74		54.2	
		21		29		26		3		33		8		68		20
25.6	42.04		25.9		15.93		24.5		29.76		19.4		61.42		56.2	
		17		30		22		2		27		11		54		24
35.5	42.21		28.9		16.15		24.3		30.03		20.5		61.96		58.6	
Sec δ, Tan δ	1.100		−0.459		1.122		+0.509		1.489		+1.103		3.662		+3.523	
Mean Place	38ˢ.119		26″.88		10ˢ.529		30″.75		23ˢ.008		27″.97		48ˢ.314		66″.68	
D′ψ α, Dω α	−0.01		−0.01		+0.01		+0.02		+0.03		+0.03		+0.08		+0.11	
Dψ δ, Dω δ	−0.2		+0.9		−0.2		+0.9		−0.2		+0.9		−0.2		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**χ Argûs.** Mag. 3.6 Right Ascension.		**χ Argûs.** Declination S.		**ω Cancri.** Mag. 5.9 Right Ascension.		**ω Cancri.** Declination N.		**χ Geminorum.** Mag. 5.0 Right Ascension.		**χ Geminorum.** Declination N.		**27 Lyncis.** Mag. 4.9 Right Ascension.		**27 Lyncis.** Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	7 54		−52 44		7 55		+25 37		7 58		+28 2		8 1		+51 45	
	s		″		s		″		s		″		s		″	
Jan. 0.6	35.75		43.2		41.57		57.8		12.15		23.6		57.53		31.6	
10.5	35.88	13	47.0	38	41.76	19	57.7	1	12.35	20	23.6	0	57.80	27	33.0	14
20.5	35.94	6	50.7	37	41.90	14	57.8	1	12.49	14	23.8	2	58.00	20	34.6	16
30.5	35.92	2	54.2	35	41.99	9	58.0	2	12.58	9	24.2	4	58.11	11	36.4	18
Feb. 9.4	35.83	9	57.5	33	42.02	3	58.4	4	12.61	3	24.7	5	58.14	3	38.2	18
19.4	35.67	16	60.5	30	41.99	3	58.9	5	12.59	2	25.4	7	58.10	4	40.0	18
Mar. 1.4	35.46	21	63.1	26	41.92	7	59.5	6	12.52	7	26.1	7	57.99	11	41.7	17
11.4	35.20	26	65.3	22	41.81	11	60.1	6	12.41	11	26.8	7	57.82	17	43.3	16
21.3	34.90	30	67.1	18	41.67	14	60.6	5	12.27	14	27.4	6	57.60	22	44.6	13
31.3	34.58	32	68.4	13	41.51	16	61.1	5	12.11	16	27.9	5	57.35	25	45.6	10
Apr. 10.3	34.25	33	69.2	8	41.34	17	61.5	4	11.94	17	28.4	5	57.09	26	46.3	7
20.3	33.92	33	69.4	2	41.18	16	61.8	3	11.77	17	28.7	3	56.83	26	46.6	3
30.2	33.60	32	69.1	3	41.03	15	62.0	2	11.61	16	28.9	2	56.59	24	46.6	0
May 10.2	33.30	30	68.4	7	40.90	13	62.1	1	11.47	14	28.9	0	56.37	22	46.2	4
20.2	33.03	27	67.2	12	40.79	11	62.1	0	11.36	11	28.8	1	56.19	18	45.4	8
30.1	32.79	24	65.5	17	40.72	7	62.0	1	11.29	7	28.6	2	56.05	14	44.4	10
June 9.1	32.60	19	63.4	21	40.69	3	61.8	2	11.25	4	28.3	3	55.96	9	43.1	13
19.1	32.46	14	61.0	24	40.69	0	61.5	3	11.25	0	27.9	4	55.92	4	41.6	15
29.1	32.37	9	58.3	27	40.72	3	61.1	4	11.28	3	27.4	5	55.94	2	39.9	17
July 9.0	32.33	4	55.4	29	40.79	7	60.7	4	11.36	8	26.9	5	56.01	7	38.0	19
19.0	32.35	2	52.4	30	40.90	11	60.3	4	11.47	11	26.3	6	56.14	13	36.1	19
29.0	32.42	7	49.3	31	41.05	15	59.8	5	11.61	14	25.6	7	56.32	18	34.1	20
Aug. 8.0	32.55	13	46.3	30	41.23	18	59.2	6	11.78	17	24.9	7	56.54	22	32.0	21
17.9	32.73	18	43.5	28	41.43	20	58.5	7	11.99	21	24.1	8	56.81	27	30.0	20
27.9	32.97	24	41.0	25	41.66	23	57.8	7	12.23	24	23.2	9	57.12	31	28.1	19
Sept. 6.9	33.26	29	38.8	22	41.92	26	57.0	8	12.49	26	22.3	9	57.47	35	26.2	19
16.8	33.59	33	37.1	17	42.20	28	56.1	9	12.77	28	21.3	10	57.86	39	24.4	18
26.8	33.95	36	35.9	12	42.50	30	55.2	9	13.08	31	20.3	10	58.28	42	22.8	16
Oct. 6.8	34.35	40	35.3	6	42.82	32	54.2	10	13.41	33	19.3	10	58.72	44	21.3	15
16.8	34.77	42	35.4	1	43.16	34	53.1	11	13.75	34	18.2	11	59.19	47	20.0	13
26.7	35.20	43	36.1	7	43.51	35	52.0	11	14.10	35	17.1	11	59.68	49	19.0	10
Nov. 5.7	35.63	43	37.4	13	43.86	35	51.0	10	14.46	36	16.0	11	60.17	49	18.3	7
15.7	36.04	41	39.4	20	44.21	35	50.0	10	14.82	36	15.0	10	60.66	49	17.9	4
25.7	36.43	39	41.9	25	44.56	35	49.1	9	15.18	36	14.2	8	61.13	47	17.8	1
Dec. 5.6	36.78	35	44.8	29	44.89	33	48.3	8	15.52	34	13.5	7	61.58	45	18.0	2
15.6	37.09	31	48.1	33	45.19	30	47.6	7	15.83	31	12.9	6	62.00	42	18.6	6
25.6	37.34	25	51.7	36	45.46	27	47.1	5	16.10	27	12.5	4	62.37	37	19.5	9
35.5	37.51	17	55.4	37	45.69	23	46.9	2	16.33	23	12.4	1	62.68	31	20.7	12
Sec δ, Tan δ	1.652		−1.315		1.109		+0.480		1.133		+0.533		1.616		+1.269	
Mean Place	34ˢ.040		55″.50		40ˢ.139		54″.27		10ˢ.678		20″.40		55ˢ.277		30″.53	
D′ψ α, Dω α	−0.03		−0.04		+0.01		+0.02		+0.01		+0.02		+0.03		+0.04	
Dψ δ, Dω δ	−0.2		+0.9		−0.2		+0.9		−0.2		+0.9		−0.2		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ρ Argûs.** Mag. 2.9				**8 H. Ursæ Majoris.** Mag. 5.5				**γ Argûs.** Mag. 2.2				**ζ Cancri** (*mean*). Mag. 4.7			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 8 3		° ′ −24 2		h m 8 4		° ′ +68 43		h m 8 6		° ′ −47 4		h m 8 7		° ′ +17 54	
	s		″		s		″		s		″		s		″	
Jan. 0.6	51.48		60.8		14.22		53.4		52.61		35.3		14.76		43.4	
10.5	51.64	16	63.7	29	14.62	40	55.6	22	52.76	15	38.9	36	14.96	20	42.7	7
20.5	51.75	11	66.5	28	14.89	27	58.0	24	52.85	9	42.5	36	15.10	14	42.3	4
30.5	51.80	5	69.1	26	15.03	14	60.6	26	52.87	2	46.0	35	15.19	9	42.1	2
Feb. 9.4	51.80	0	71.5	24	15.04	1	63.2	26	52.82	5	49.2	32	15.23	4	42.0	1
19.4	51.75	5	73.6	21	14.93	11	65.7	25	52.71	11	52.2	30	15.22	1	42.0	0
Mar. 1.4	51.66	9	75.4	18	14.71	22	68.0	23	52.55	16	54.8	26	15.16	6	42.2	2
11.4	51.53	13	76.9	15	14.39	32	70.0	20	52.34	21	57.0	22	15.06	10	42.5	3
21.3	51.37	16	78.0	11	13.99	40	71.6	16	52.10	24	58.8	18	14.94	12	42.8	3
31.3	51.19	18	78.7	7	13.54	45	72.8	12	51.83	27	60.1	13	14.80	14	43.2	4
Apr. 10.3	51.01	18	79.1	4	13.06	48	73.5	7	51.55	28	61.0	9	14.65	15	43.5	3
20.3	50.83	18	79.1	0	12.57	49	73.8	3	51.27	28	61.3	3	14.49	16	43.8	3
30.2	50.66	17	78.8	3	12.10	47	73.6	2	51.00	27	61.1	2	14.34	15	44.1	3
May 10.2	50.50	16	78.1	7	11.67	43	72.9	7	50.74	26	60.5	6	14.21	13	44.4	3
20.2	50.36	14	77.1	10	11.29	38	71.7	12	50.51	23	59.4	11	14.11	10	44.6	2
30.1	50.25	11	75.8	13	10.98	31	70.1	16	50.31	20	57.9	15	14.04	7	44.8	2
June 9.1	50.18	7	74.2	16	10.76	22	68.2	19	50.15	16	56.0	19	14.00	4	44.9	1
19.1	50.14	4	72.4	18	10.63	13	66.0	22	50.03	12	53.7	23	13.99	1	45.0	1
29.1	50.13	1	70.4	20	10.59	4	63.5	25	49.95	8	51.2	25	14.02	3	45.1	1
July 9.0	50.15	2	68.3	21	10.65	6	60.9	26	49.92	3	48.5	27	14.08	6	45.1	0
19.0	50.21	6	66.2	21	10.80	15	58.2	27	49.94	2	45.6	29	14.17	9	45.0	1
29.0	50.30	9	64.1	21	11.04	24	55.4	28	50.01	7	42.7	29	14.29	12	44.9	1
Aug. 8.0	50.43	13	62.0	21	11.37	33	52.7	27	50.12	11	39.9	28	14.45	16	44.7	2
17.9	50.59	16	60.1	19	11.78	41	50.0	27	50.28	16	37.2	27	14.63	18	44.4	3
27.9	50.78	19	58.4	17	12.26	48	47.4	26	50.49	21	34.7	25	14.84	21	44.0	4
Sept. 6.9	51.00	22	57.1	13	12.82	56	45.0	24	50.74	25	32.6	21	15.07	23	43.5	5
16.8	51.25	25	56.1	10	13.44	62	42.8	22	51.03	29	30.9	17	15.33	26	42.9	6
26.8	51.52	27	55.6	5	14.12	68	40.9	19	51.36	33	29.8	11	15.61	28	42.1	8
Oct. 6.8	51.81	29	55.5	1	14.84	72	39.2	17	51.72	36	29.2	6	15.91	30	41.2	9
16.8	52.12	31	55.9	4	15.59	75	37.9	13	52.10	38	29.2	0	16.23	32	40.1	11
26.7	52.44	32	56.8	9	16.37	78	37.0	9	52.49	39	29.8	6	16.56	33	38.9	12
Nov. 5.7	52.77	33	58.2	14	17.15	78	36.5	5	52.89	40	31.1	13	16.90	34	37.7	12
15.7	53.10	33	60.0	18	17.93	78	36.4	1	53.28	39	32.9	18	17.24	34	36.4	13
25.7	53.41	31	62.2	22	18.69	76	36.8	4	53.65	37	35.3	24	17.57	33	35.2	12
Dec. 5.6	53.70	29	64.7	25	19.40	71	37.6	8	53.99	34	38.2	29	17.89	32	34.0	12
15.6	53.97	27	67.5	28	20.05	65	38.9	13	54.29	30	41.4	32	18.19	30	32.9	11
25.6	54.20	23	70.4	29	20.61	56	40.6	17	54.54	25	44.8	34	18.45	26	31.9	10
35.5	54.39	19	73.4	30	21.07	46	42.6	20	54.74	20	48.4	36	18.67	22	31.1	8
Sec δ, Tan δ	1.095		−0.446		2.757		+2.569		1.468		−1.075		1.051		+0.323	
Mean Place	$50^{s}.318$		70″.13		$10^{s}.194$		53″.25		$51^{s}.147$		47″.56		$13^{s}.463$		39″.55	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.01		−0.02		+0.06		+0.09		−0.02		−0.04		+0.01		+0.01	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.2		+0.9		−0.2		+0.9		−0.2		+0.9		−0.2		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**Bradley 1147.** Mag. 5.7				**20 Puppis.** Mag. 5.0				**β Cancri.** Mag. 3.8				**31 Lyncis.** Mag. 4.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 8 8		° ′ +76 1		h m 8 9		° ′ −15 31		h m 8 11		° ′ + 9 27		h m 8 16		° ′ +43 27	
	s		″		s		″		s		″		s		″	
Jan. 0.6	44.74		25.5		21.16		23.4		49.10		20.5		55.03		65.7	
10.5	45.30	56	28.0	25	21.33	17	25.9	25	49.29	19	19.4	11	55.29	26	66.6	9
20.5	45.68	38	30.7	27	21.45	12	28.3	24	49.43	14	18.4	10	55.48	19	67.7	11
30.5	45.87	19	33.5	28	21.51	6	30.5	22	49.52	9	17.6	8	55.60	12	68.9	12
Feb. 9.5	45.87	0	36.4	29	21.53	2	32.5	20	49.56	4	17.0	6	55.66	6	70.3	14
19.4	45.68	19	39.1	27	21.50	3	34.3	18	49.55	1	16.6	4	55.65	1	71.8	15
Mar. 1.4	45.32	36	41.6	25	21.43	7	35.8	15	49.49	6	16.3	3	55.58	7	73.2	14
11.4	44.82	50	43.8	22	21.32	11	37.0	12	49.40	9	16.2	1	55.46	12	74.6	14
21.3	44.20	62	45.6	18	21.18	14	37.8	8	49.28	12	16.3	1	55.29	17	75.8	12
31.3	43.49	71	46.9	13	21.02	16	38.3	5	49.14	14	16.4	1	55.10	19	76.8	10
Apr. 10.3	42.74	75	47.7	8	20.86	16	38.6	3	48.99	15	16.6	2	54.89	21	77.5	7
20.3	41.98	76	48.0	3	20.69	17	38.6	0	48.84	15	16.9	3	54.67	22	78.0	5
30.2	41.23	75	47.7	3	20.53	16	38.3	3	48.70	14	17.3	4	54.47	20	78.2	2
May 10.2	40.53	70	46.9	8	20.39	14	37.7	6	48.58	12	17.7	4	54.29	18	78.1	1
20.2	39.91	62	45.6	13	20.27	12	36.8	9	48.48	10	18.1	4	54.14	15	77.7	4
30.2	39.40	51	43.8	18	20.18	9	35.7	11	48.41	7	18.5	4	54.02	12	77.1	6
June 9.1	39.00	40	41.7	21	20.12	6	34.4	13	48.36	5	19.0	5	53.94	8	76.2	9
19.1	38.73	27	39.2	25	20.09	3	32.9	15	48.34	2	19.5	5	53.90	4	75.1	11
29.1	38.60	13	36.5	27	20.09	0	31.2	17	48.36	2	20.0	5	53.91	1	73.8	13
July 9.0	38.62	2	33.6	29	20.12	3	29.5	17	48.41	5	20.4	4	53.96	5	72.4	14
19.0	38.78	16	30.6	30	20.18	6	27.7	18	48.49	8	20.8	4	54.06	10	70.8	16
29.0	39.08	30	27.6	30	20.27	9	26.0	17	48.61	12	21.2	4	54.20	14	69.2	16
Aug. 8.0	39.51	43	24.6	30	20.40	13	24.3	17	48.75	14	21.5	3	54.38	18	67.5	17
17.9	40.07	56	21.6	30	20.56	16	22.8	15	48.92	17	21.7	2	54.60	22	65.8	17
27.9	40.75	68	18.8	28	20.75	19	21.5	13	49.11	19	21.7	0	54.86	26	64.1	17
Sept. 6.9	41.54	79	16.2	26	20.96	21	20.5	10	49.33	22	21.6	1	55.15	29	62.4	17
16.9	42.43	89	13.8	24	21.20	24	19.9	6	49.58	25	21.3	3	55.47	32	60.7	17
26.8	43.40	97	11.7	21	21.46	26	19.6	3	49.85	27	20.8	5	55.82	35	59.1	16
Oct. 6.8	44.44	104	10.0	17	21.74	28	19.7	1	50.13	28	20.0	8	56.20	38	57.6	15
16.8	45.53	109	8.7	13	22.04	30	20.2	5	50.43	30	19.0	10	56.60	40	56.2	14
26.7	46.66	113	7.8	9	22.35	31	21.2	10	50.75	32	17.9	11	57.02	42	54.9	13
Nov. 5.7	47.80	114	7.3	5	22.67	32	22.6	14	51.08	33	16.6	13	57.44	42	53.9	10
15.7	48.93	113	7.3	0	22.99	32	24.3	17	51.40	32	15.1	15	57.87	43	53.1	8
25.7	50.02	109	7.8	5	23.30	31	26.4	21	51.72	32	13.6	15	58.30	43	52.5	6
Dec. 5.6	51.04	102	8.8	10	23.59	29	28.7	23	52.03	31	12.0	16	58.71	41	52.2	3
15.6	51.97	93	10.3	15	23.86	27	31.2	25	52.32	29	10.5	15	59.09	38	52.2	0
25.6	52.78	81	12.2	19	24.10	24	33.8	26	52.58	26	9.1	14	59.43	34	52.6	4
35.6	53.44	66	14.4	22	24.30	20	36.4	26	52.79	21	7.8	13	59.72	29	53.3	7
Sec δ, Tan δ	4.141		+4.018		1.038		−0.278		1.014		+0.167		1.378		+0.948	
Mean Place	38ˢ.597		25″.95		20ˢ.040		31″.68		47ˢ.893		15″.79		53ˢ.172		65″.23	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	+0.09		+0.14		−0.01		−0.01		0.00		+0.01		+0.02		+0.04	
$D_\psi\,\delta$, $D_\omega\,\delta$	−0.2		+0.8		−0.2		+0.8		−0.2		+0.8		−0.2		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	d^1 Cancri. Mag. 5.9				ε Argûs. Mag. 1.7				30 Monocerotis. Mag. 4.0				o Ursæ Majoris. Mag. 3.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	8 18		+18 36		8 20		−59 13		8 21		− 3 37		8 23		+61 0	
	s		″		s		″		s		″		s		″	
Jan. 0.6	24.35	21	47.2	6	45.58	18	31.2	38	19.97	19	12.5	19	5.82	36	34.8	18
10.5	24.56	15	46.6	4	45.76	10	35.0	38	20.16	14	14.4	18	6.18	26	36.6	20
20.5	24.71	10	46.2	2	45.86	1	38.8	37	20.30	9	16.2	16	6.44	16	38.6	21
30.5	24.81	5	46.0	1	45.87	8	42.5	36	20.39	4	17.8	14	6.60	6	40.7	23
Feb. 9.5	24.86	0	45.9	1	45.79	16	46.1	34	20.43	1	19.2	12	6.66	3	43.0	23
19.4	24.86	5	46.0	2	45.63	23	49.5	30	20.42	5	20.4	9	6.63	12	45.3	22
Mar. 1.4	24.81	9	46.2	3	45.40	29	52.5	26	20.37	9	21.3	7	6.51	20	47.5	20
11.4	24.72	12	46.5	4	45.11	33	55.1	22	20.28	12	22.0	5	6.31	26	49.5	17
21.4	24.60	14	46.9	4	44.78	37	57.3	17	20.16	14	22.5	3	6.05	31	51.2	13
31.3	24.46	15	47.3	4	44.41	39	59.0	12	20.02	15	22.8	0	5.74	34	52.5	9
Apr. 10.3	24.31	15	47.7	4	44.02	40	60.2	7	19.87	15	22.8	2	5.40	35	53.4	5
20.3	24.16	14	48.1	3	43.62	39	60.9	2	19.72	14	22.6	3	5.05	34	53.9	1
30.2	24.02	13	48.4	3	43.23	38	61.1	3	19.58	13	22.3	5	4.71	31	54.0	3
May 10.2	23.89	11	48.7	2	42.85	35	60.8	9	19.45	11	21.8	6	4.40	27	53.7	8
20.2	23.78	8	48.9	2	42.50	32	59.9	14	19.34	8	21.2	8	4.13	23	52.9	12
30.2	23.70	5	49.1	1	42.18	28	58.5	18	19.26	6	20.4	9	3.90	17	51.7	15
June 9.1	23.65	2	49.2	1	41.90	22	56.7	21	19.20	3	19.5	10	3.73	11	50.2	18
19.1	23.63	2	49.3	0	41.68	17	54.6	25	19.17	0	18.5	11	3.62	4	48.4	21
29.1	23.65	5	49.3	0	41.51	11	52.1	28	19.17	4	17.4	11	3.58	3	46.3	23
July 9.1	23.70	8	49.3	1	41.40	5	49.3	30	19.21	6	16.3	11	3.61	10	44.0	24
19.0	23.78	12	49.2	2	41.35	2	46.3	31	19.27	9	15.2	11	3.71	16	41.6	25
29.0	23.90	14	49.0	3	41.37	9	43.2	30	19.36	13	14.1	10	3.87	22	39.1	26
Aug. 8.0	24.04	17	48.7	4	41.46	15	40.2	30	19.49	15	13.1	9	4.09	29	36.5	25
17.9	24.21	20	48.3	5	41.61	22	37.2	28	19.64	18	12.2	7	4.38	34	34.0	25
27.9	24.41	23	47.8	6	41.83	29	34.4	24	19.82	20	11.5	5	4.72	40	31.5	24
Sept. 6.9	24.64	25	47.2	7	42.12	34	32.0	20	20.02	23	11.0	2	5.12	45	29.1	22
16.9	24.89	27	46.5	9	42.46	39	30.0	15	20.25	25	10.8	1	5.57	49	26.9	21
26.8	25.16	29	45.6	10	42.85	43	28.5	10	20.50	28	10.9	4	6.06	53	24.8	19
Oct. 6.8	25.45	32	44.6	11	43.28	47	27.5	3	20.78	29	11.3	8	6.59	57	22.9	16
16.8	25.77	33	43.5	12	43.75	49	27.2	3	21.07	31	12.1	11	7.16	59	21.3	12
26.8	26.10	34	42.3	13	44.24	50	27.5	10	21.38	31	13.2	14	7.75	60	20.1	9
Nov. 5.7	26.44	34	41.0	14	44.74	49	28.5	16	21.69	32	14.6	16	8.35	61	19.2	6
15.7	26.78	34	39.6	13	45.23	47	30.1	22	22.01	32	16.2	18	8.96	60	18.6	1
25.7	27.12	33	38.3	12	45.70	43	32.3	28	22.33	31	18.0	20	9.56	57	18.5	3
Dec. 5.6	27.45	30	37.1	11	46.13	37	35.1	32	22.64	28	20.0	21	10.13	53	18.8	7
15.6	27.75	27	36.0	10	46.50	31	38.3	35	22.92	25	22.1	21	10.66	47	19.5	12
25.6	28.02	23	35.0	8	46.81	23	41.8	37	23.17	21	24.2	20	11.13	40	20.7	15
35.6	28.25		34.2		47.04		45.5		23.38		26.2		11.53		22.2	
Sec δ, Tan δ	1.055		+0.337		1.955		−1.679		1.002		−0.063		2.063		+1.805	
Mean Place	23ˢ.059		43″.99		43ˢ.779		45″.38		18ˢ.869		18″.95		2ˢ.882		36″.13	
D′ψ a, Dω a	+0.01		+0.01		−0.04		−0.06		0.00		0.00		+0.04		+0.07	
Dψ δ, Dω δ	−0.2		+0.8		−0.2		+0.8		−0.2		+0.8		−0.2		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**θ Chamæleontis.** Mag. 4.3				**Groombridge 1450.** Mag. 6.0				**η Cancri.** Mag. 5.5				**Groombridge 1446.** Mag. 6.3			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 8 23		° ′ −77 11		h m 8 27		° ′ +38 18		h m 8 27		° ′ +20 44		h m 8 30		° ′ +73 55	
	s		″		s		″		s		″		s		″	
Jan. 0.6	20.21		59.5		17.57		56.3		42.11		17.1		9.02		63.4	
10.5	20.45	24	63.3	38	17.83	26	56.8	5	42.33	22	16.5	6	9.58	56	65.7	23
20.5	20.51	6	67.2	39	18.02	19	57.5	7	42.50	17	16.2	3	9.99	41	68.2	25
30.5	20.38	13	71.0	38	18.15	13	58.4	9	42.61	11	16.1	1	10.24	25	70.9	27
Feb. 9.5	20.07	31	74.7	37	18.22	7	59.5	11	42.67	6	16.1	0	10.32	8	73.7	28
19.4	19.59	48	78.2	35	18.22	0	60.7	12	42.68	1	16.3	2	10.23	9	76.4	27
Mar. 1.4	18.96	63	81.4	32	18.17	5	62.0	13	42.64	4	16.7	4	9.99	24	79.0	26
11.4	18.20	76	84.3	29	18.07	10	63.2	12	42.56	8	17.1	4	9.62	37	81.3	23
21.4	17.33	87	86.7	24	17.93	14	64.3	11	42.45	11	17.6	5	9.13	49	83.3	20
31.3	16.39	94	88.7	20	17.76	17	65.3	10	42.31	14	18.1	5	8.56	57	84.8	15
Apr. 10.3	15.39	100	90.2	15	17.57	19	66.0	7	42.16	15	18.6	5	7.93	63	85.9	11
20.3	14.36	103	91.2	10	17.38	19	66.5	5	42.01	15	19.0	4	7.27	66	86.4	5
30.2	13.33	103	91.7	5	17.19	19	66.8	3	41.86	15	19.3	3	6.62	65	86.4	0
May 10.2	12.32	101	91.6	1	17.02	17	66.9	1	41.72	14	19.6	3	6.01	61	85.9	5
20.2	11.36	96	91.0	6	16.88	14	66.7	2	41.61	11	19.8	2	5.45	56	84.9	10
30.2	10.46	90	89.8	12	16.77	11	66.3	4	41.53	8	19.9	1	4.97	48	83.4	15
June 9.1	9.65	81	88.2	16	16.70	7	65.7	6	41.47	6	20.0	1	4.58	39	81.5	19
19.1	8.94	71	86.2	20	16.66	4	64.9	8	41.44	3	20.0	0	4.30	28	79.3	22
29.1	8.36	58	83.8	24	16.66	0	63.9	10	41.45	1	19.9	1	4.13	17	76.8	25
July 9.1	7.92	44	81.1	27	16.70	4	62.7	12	41.49	4	19.7	2	4.08	5	74.0	28
19.0	7.64	28	78.1	30	16.78	8	61.4	13	41.56	7	19.4	3	4.15	7	71.0	30
29.0	7.52	12	75.0	31	16.90	12	60.0	14	41.67	11	19.1	3	4.35	20	68.0	30
Aug. 8.0	7.56	4	71.9	31	17.06	16	58.6	14	41.81	14	18.7	4	4.66	31	64.9	31
17.9	7.77	21	68.8	31	17.25	19	57.1	15	41.98	17	18.2	5	5.09	43	61.9	30
27.9	8.14	37	65.9	29	17.48	23	55.6	15	42.17	19	17.6	6	5.62	53	58.9	30
Sept. 6.9	8.67	53	63.3	26	17.74	26	54.0	16	42.39	22	16.8	8	6.25	63	56.1	28
16.9	9.35	68	61.0	23	18.03	29	52.4	16	42.64	25	15.9	9	6.97	72	53.5	26
26.8	10.15	80	59.2	18	18.35	32	50.9	15	42.91	27	14.9	10	7.77	80	51.2	23
Oct. 6.8	11.05	90	58.0	12	18.69	34	49.4	15	43.21	30	13.8	11	8.65	88	49.1	21
16.8	12.03	98	57.4	6	19.06	37	47.9	15	43.52	31	12.6	12	9.58	93	47.4	17
26.8	13.05	102	57.4	0	19.45	39	46.5	14	43.85	33	11.3	13	10.55	97	46.1	13
Nov. 5.7	14.07	102	58.1	7	19.85	40	45.3	12	44.19	34	9.9	14	11.54	99	45.3	8
15.7	15.07	100	59.5	14	20.25	40	44.2	11	44.54	35	8.5	14	12.54	100	45.0	3
25.7	15.99	92	61.5	20	20.65	40	43.4	8	44.89	35	7.2	13	13.52	98	45.1	1
Dec. 5.6	16.82	83	64.0	25	21.04	39	42.8	6	45.22	33	6.0	12	14.46	94	45.7	6
15.6	17.51	69	67.0	30	21.40	36	42.5	3	45.53	31	4.9	11	15.32	86	46.8	11
25.6	18.04	53	70.4	34	21.73	33	42.5	0	45.81	28	4.0	9	16.09	77	48.4	16
35.6	18.41	37	74.1	37	22.02	29	42.8	3	46.06	25	3.3	7	16.74	65	50.4	20
Sec δ, Tan δ	4.515		−4.403		1.274		+0.790		1.069		+0.379		3.614		+3.473	
Mean Place	16ˢ.110		75″.38		15ˢ.899		55″.99		40ˢ.811		14″.54		3ˢ.712		65″.86	
D′ψ α, Dω α	−0.09		−0.17		+0.02		+0.03		+0.01		+0.02		+0.07		+0.14	
Dψ δ, Dω δ	−0.2		+0.8		−0.2		+0.8		−0.2		+0.8		−0.2		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Hydræ. Mag. 4.2				σ Hydræ. Mag. 4.5				γ Cancri. Mag. 4.7				δ Cancri. Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 8 33		° ′ + 6 0		h m 8 34		° ′ + 3 38		h m 8 38		° ′ +21 46		h m 8 39		° ′ +18 28	
	s		″		s		″		s		″		s		″	
Jan. 0.6	4.23		32.7		13.80		56.3		16.54		57.3		45.84		31.3	
10.6	4.43	20	31.3	14	14.00	20	54.7	16	16.77	23	56.7	6	46.07	23	30.5	8
20.5	4.59	16	30.0	13	14.15	15	53.3	14	16.95	18	56.4	3	46.25	18	29.9	6
30.5	4.70	11	28.9	11	14.26	11	52.1	12	17.08	13	56.3	1	46.37	12	29.6	3
Feb. 9.5	4.76	6	28.0	9	14.32	6	51.1	10	17.15	7	56.4	1	46.44	7	29.5	1
19.4	4.77	1	27.4	6	14.33	1	50.3	8	17.17	2	56.7	3	46.46	2	29.6	1
Mar. 1.4	4.73	4	27.0	4	14.29	4	49.7	6	17.14	3	57.1	4	46.43	3	29.8	2
11.4	4.66	7	26.7	3	14.22	7	49.3	4	17.06	8	57.6	5	46.36	7	30.1	3
21.4	4.55	11	26.6	1	14.11	11	49.1	2	16.95	11	58.2	6	46.26	10	30.5	4
31.3	4.42	13	26.6	0	13.98	13	49.1	0	16.82	13	58.8	6	46.13	13	31.0	5
Apr. 10.3	4.28	14	26.8	2	13.84	14	49.2	1	16.67	15	59.3	5	45.99	14	31.5	5
20.3	4.14	14	27.1	3	13.70	14	49.4	2	16.52	15	59.8	5	45.84	15	31.9	4
30.3	4.00	14	27.4	3	13.57	13	49.8	4	16.37	15	60.2	4	45.69	15	32.3	4
May 10.2	3.87	13	27.8	4	13.44	13	50.2	4	16.23	14	60.5	3	45.56	13	32.6	3
20.2	3.76	11	28.3	5	13.33	11	50.7	5	16.12	11	60.7	2	45.45	11	32.9	3
30.2	3.68	8	28.8	5	13.24	9	51.3	6	16.03	9	60.8	1	45.36	9	33.1	2
June 9.1	3.62	6	29.4	6	13.18	6	51.9	6	15.96	7	60.8	0	45.30	6	33.3	2
19.1	3.59	3	30.0	6	13.15	3	52.6	7	15.93	3	60.7	1	45.26	4	33.4	1
29.1	3.59	0	30.6	6	13.15	0	53.3	7	15.93	0	60.6	1	45.26	0	33.4	0
July 9.1	3.62	3	31.2	6	13.18	3	54.1	8	15.96	3	60.4	2	45.29	3	33.3	1
19.0	3.68	6	31.8	6	13.24	6	54.8	7	16.02	6	60.1	3	45.35	6	33.1	2
29.0	3.77	9	32.3	5	13.33	9	55.4	6	16.12	10	59.7	4	45.44	9	32.9	2
Aug. 8.0	3.89	12	32.7	4	13.44	11	56.0	6	16.25	13	59.2	5	45.57	13	32.6	3
18.0	4.04	15	33.0	3	13.58	14	56.4	4	16.41	16	58.5	7	45.72	15	32.2	4
27.9	4.21	17	33.2	2	13.75	17	56.7	3	16.59	18	57.8	7	45.90	18	31.6	6
Sept. 6.9	4.41	20	33.2	0	13.95	20	56.8	1	16.80	21	56.9	9	46.11	21	30.9	7
16.9	4.64	23	33.0	2	14.17	22	56.7	1	17.04	24	55.9	10	46.34	23	30.1	8
26.8	4.89	25	32.5	5	14.42	25	56.3	4	17.31	27	54.8	11	46.60	26	29.1	10
Oct. 5.8	5.16	27	31.8	7	14.69	27	55.6	7	17.60	29	53.6	12	46.88	28	28.0	11
15.8	5.45	29	30.8	10	14.98	29	54.7	9	17.91	31	52.3	13	47.18	30	26.7	13
25.8	5.76	31	29.6	12	15.29	31	53.5	12	18.24	33	50.9	14	47.50	32	25.3	14
Nov. 5.7	6.09	33	28.2	14	15.61	32	52.1	14	18.58	34	49.5	14	47.84	34	23.9	14
15.7	6.42	33	26.6	16	15.94	33	50.5	16	18.93	35	48.1	14	48.19	35	22.4	15
25.7	6.74	32	24.9	17	16.26	32	48.8	17	19.28	35	46.8	13	48.53	34	21.0	14
Dec. 5.7	7.05	31	23.2	17	16.57	31	47.0	18	19.62	34	45.5	13	48.87	34	19.6	14
15.6	7.35	30	21.5	17	16.87	30	45.2	18	19.94	32	44.4	11	49.19	32	18.3	13
25.6	7.62	27	19.8	17	17.14	27	43.4	18	20.24	30	43.5	9	49.48	29	17.2	11
35.6	7.85	23	18.2	16	17.36	22	41.7	17	20.50	26	42.8	7	49.73	25	16.3	9
Sec δ, Tan δ	1.006		+0.105		1.002		+0.064		1.077		+0.400		1.054		+0.334	
Mean Place	3ˢ.107		28″.05		12ˢ.691		51″.25		15ˢ.247		55″.44		44ˢ.601		28″.93	
D′ψ α, Dω α	0.00		0.00		0.00		0.00		+0.01		+0.02		+0.01		+0.01	
Dψ δ, Dω δ	−0.2		+0.8		−0.2		+0.8		−0.3		+0.8		−0.3		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Pyxidis. Mag. 3.7				ι Cancri. Mag. 4.2				ε Hydræ. Mag. 3.5				δ Argûs. Mag. 2.0			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 8 40		° ′ −32 52		h m 8 41		° ′ +29 4		h m 8 42		° ′ + 6 44		h m 8 42		° ′ −54 23	
	s		″		s		″		s		″		s		″	
Jan. 0.6	6.82	19	8.7	33	27.60	24	44.3	1	11.33	21	23.5	14	19.32	21	7.3	37
10.6	7.01	14	12.0	33	27.84	19	44.2	1	11.54	17	22.1	12	19.53	14	11.0	38
20.5	7.15	9	15.3	31	28.03	14	44.3	3	11.71	12	20.9	11	19.67	6	14.8	37
30.5	7.24	3	18.4	29	28.17	8	44.6	6	11.83	6	19.8	9	19.73	1	18.5	36
Feb. 9.5	7.27	3	21.3	27	28.25	3	45.2	7	11.89	2	18.9	6	19.72	9	22.1	34
19.4	7.24	8	24.0	24	28.28	3	45.9	8	11.91	3	18.3	4	19.63	15	25.5	31
Mar. 1.4	7.16	11	26.4	20	28.25	8	46.7	9	11.88	7	17.9	2	19.48	21	28.6	28
11.4	7.05	15	28.4	17	28.17	11	47.6	8	11.81	10	17.7	1	19.27	26	31.4	23
21.4	6.90	18	30.1	13	28.06	14	48.4	8	11.71	12	17.6	0	19.01	29	33.7	19
31.3	6.72	19	31.4	9	27.92	16	49.2	7	11.59	13	17.6	2	18.72	31	35.6	14
Apr. 10.3	6.53	20	32.3	4	27.76	16	49.9	6	11.46	14	17.8	3	18.41	32	37.0	9
20.3	6.33	19	32.7	0	27.60	16	50.5	4	11.32	14	18.1	4	18.09	33	37.9	4
30.3	6.14	18	32.7	3	27.44	15	50.9	3	11.18	13	18.5	4	17.76	32	38.3	1
May 10.2	5.96	17	32.4	7	27.29	13	51.2	1	11.05	11	18.9	4	17.44	30	38.2	6
20.2	5.79	15	31.7	11	27.16	10	51.3	1	10.94	9	19.3	5	17.14	27	37.6	11
30.2	5.64	12	30.6	15	27.06	7	51.2	2	10.85	6	19.8	6	16.87	24	36.5	16
June 9.1	5.52	9	29.1	18	26.99	4	51.0	4	10.79	3	20.4	6	16.63	20	34.9	19
19.1	5.43	6	27.3	20	26.95	1	50.6	5	10.76	1	21.0	6	16.43	16	33.0	23
29.1	5.37	2	25.3	22	26.94	3	50.1	6	10.75	2	21.6	5	16.27	11	30.7	26
July 9.1	5.35	1	23.1	23	26.97	7	49.5	8	10.77	5	22.1	5	16.16	5	28.1	28
19.0	5.36	5	20.8	24	27.04	10	48.7	9	10.82	8	22.6	4	16.11	0	25.3	29
29.0	5.41	8	18.4	24	27.14	13	47.8	9	10.90	11	23.0	4	16.11	6	22.4	30
Aug. 8.0	5.49	12	16.0	22	27.27	16	46.9	10	11.01	14	23.4	3	16.17	12	19.4	29
18.0	5.61	16	13.8	20	27.43	19	45.9	12	11.15	17	23.7	1	16.29	17	16.5	27
27.9	5.77	20	11.8	18	27.62	22	44.7	12	11.32	19	23.8	1	16.46	23	13.8	24
Sept. 6.9	5.97	23	10.0	14	27.84	25	43.5	13	11.51	22	23.7	3	16.69	29	11.4	21
16.9	6.20	26	8.6	10	28.09	28	42.2	14	11.73	24	23.4	6	16.98	33	9.3	16
26.8	6.46	29	7.6	5	28.37	31	40.8	14	11.97	27	22.8	8	17.31	38	7.7	11
Oct. 6.8	6.75	31	7.1	0	28.68	33	39.4	15	12.24	29	22.0	10	17.69	41	6.6	5
16.8	7.06	34	7.1	6	29.01	34	37.9	15	12.53	31	21.0	12	18.10	44	6.1	2
26.8	7.40	35	7.7	12	29.35	36	36.4	14	12.84	32	19.8	14	18.54	45	6.3	8
Nov. 5.7	7.75	35	8.9	17	29.71	37	35.0	13	13.16	33	18.4	16	18.99	45	7.1	15
15.7	8.10	35	10.6	21	30.08	37	33.7	12	13.49	33	16.8	17	19.44	45	8.6	21
25.7	8.45	33	12.7	25	30.45	36	32.5	11	13.82	32	15.1	18	19.89	42	10.7	26
Dec. 5.7	8.78	30	15.2	29	30.81	34	31.4	8	14.14	30	13.3	17	20.31	37	13.3	30
15.6	9.08	27	18.1	31	31.15	31	30.6	6	14.44	27	11.6	17	20.68	32	16.3	34
25.6	9.35	23	21.2	32	31.46	28	30.0	3	14.71	24	9.9	16	21.00	26	19.7	36
35.6	9.58		24.4		31.74		29.7		14.95		8.3		21.26		23.3	
Sec δ, Tan δ	1.191		−0.646		1.144		+0.556		1.007		+0.118		1.717		−1.396	
Mean Place	5$^{\mathrm{s}}$.740		20″.14		26$^{\mathrm{s}}$.184		43″.76		10$^{\mathrm{s}}$.222		19″.29		17$^{\mathrm{s}}$.895		21″.91	
D′ψ a, Dω a	−0.01		−0.03		+0.01		+0.02		0.00		+0.01		−0.03		−0.06	
Dψ δ, Dω δ	−0.3		+0.8		−0.3		+0.8		−0.3		+0.8		−0.3		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	σ^2 Cancri (*mean*). Mag. 5.5				ζ Hydræ. Mag. 3.3				ι Ursæ Majoris. Mag. 3.1				α Cancri. Mag. 4.3			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	8 48		+30 54		8 50		+ 6 16		8 53		+48 22		8 53		+12 11	
	s		″		s		″		s		″		s		″	
Jan. 0.6	57.85	26	34.4	1	48.88	22	42.2	14	17.46	32	59.5	9	44.98	23	45.1	12
10.6	58.11	20	34.3	2	49.10	18	40.8	13	17.78	25	60.4	12	45.21	19	43.9	10
20.5	58.31	15	34.5	4	49.28	13	39.5	11	18.03	18	61.6	14	45.40	13	42.9	7
30.5	58.46	9	34.9	6	49.41	7	38.4	9	18.21	11	63.0	16	45.53	8	42.2	5
Feb. 9.5	58.55	3	35.5	8	49.48	2	37.5	7	18.32	3	64.6	17	45.61	3	41.7	3
19.5	58.58	2	36.3	10	49.50	2	36.8	5	18.35	4	66.3	18	45.64	1	41.4	2
Mar. 1.4	58.56	7	37.3	10	49.48	6	36.3	2	18.31	10	68.1	17	45.63	6	41.2	0
11.4	58.49	11	38.3	9	49.42	9	36.1	1	18.21	15	69.8	16	45.57	9	41.2	2
21.4	58.38	14	39.2	9	49.33	12	36.0	0	18.06	19	71.4	14	45.48	12	41.4	3
31.3	58.24	16	40.1	8	49.21	13	36.0	2	17.87	21	72.8	11	45.36	13	41.7	3
Apr. 10.3	58.08	17	40.9	6	49.08	14	36.2	3	17.66	23	73.9	8	45.23	14	42.0	4
20.3	57.91	16	41.5	5	48.94	13	36.5	3	17.43	23	74.7	5	45.09	14	42.4	4
30.3	57.75	15	42.0	3	48.81	13	36.8	4	17.20	22	75.2	1	44.95	13	42.8	4
May 10.2	57.60	13	42.3	1	48.68	11	37.2	5	16.98	19	75.3	2	44.82	11	43.2	4
20.2	57.47	11	42.4	1	48.57	9	37.7	5	16.79	17	75.1	5	44.71	9	43.6	4
30.2	57.36	8	42.3	3	48.48	7	38.2	6	16.62	13	74.6	9	44.62	7	44.0	4
June 9.2	57.28	5	42.0	4	48.41	4	38.8	6	16.49	9	73.7	11	44.55	4	44.4	3
19.1	57.23	1	41.6	6	48.37	1	39.4	6	16.40	4	72.6	14	44.51	1	44.7	3
29.1	57.22	2	41.0	7	48.36	1	40.0	5	16.36	0	71.2	16	44.50	1	45.0	3
July 9.1	57.24	6	40.3	9	48.37	4	40.5	5	16.36	5	69.6	18	44.51	4	45.3	2
19.0	57.30	9	39.4	10	48.41	8	41.0	5	16.41	9	67.8	20	44.55	8	45.5	1
29.0	57.39	12	38.4	10	48.49	10	41.5	4	16.50	14	65.8	21	44.63	10	45.6	0
Aug. 8.0	57.51	15	37.4	12	48.59	13	41.9	2	16.64	18	63.7	21	44.73	13	45.6	1
18.0	57.66	19	36.2	13	48.72	16	42.1	1	16.82	22	61.6	22	44.86	16	45.5	2
27.9	57.85	22	34.9	14	48.88	18	42.2	1	17.04	26	59.4	22	45.02	19	45.3	4
Sept. 6.9	58.07	25	33.5	14	49.06	21	42.1	3	17.30	31	57.2	21	45.21	22	44.9	6
16.9	58.32	28	32.1	15	49.27	24	41.8	5	17.61	34	55.1	21	45.43	24	44.3	8
26.9	58.60	30	30.6	15	49.51	26	41.3	8	17.95	37	53.0	20	45.67	26	43.5	10
Oct. 6.8	58.90	33	29.1	16	49.77	29	40.5	10	18.32	41	51.0	19	45.93	29	42.5	12
16.8	59.23	35	27.5	15	50.06	31	39.5	13	18.73	43	49.1	17	46.22	31	41.3	14
26.8	59.58	37	26.0	15	50.37	32	38.2	15	19.16	45	47.4	14	46.53	33	39.9	15
Nov. 5.7	59.95	37	24.5	14	50.69	33	36.7	16	19.61	46	46.0	12	46.86	33	38.4	16
15.7	60.32	38	23.1	12	51.02	33	35.1	17	20.07	47	44.8	9	47.19	34	36.8	16
25.7	60.70	37	21.9	10	51.35	32	33.4	18	20.54	45	43.9	5	47.53	33	35.2	17
Dec. 5.7	61.07	35	20.9	8	51.67	30	31.6	18	20.99	43	43.4	1	47.86	32	33.5	16
15.6	61.42	32	20.1	6	51.97	28	29.8	17	21.42	40	43.3	2	48.18	29	31.9	14
25.6	61.74	29	19.5	3	52.25	25	28.1	16	21.82	35	43.5	6	48.47	25	30.5	13
35.6	62.03		19.2		52.50		26.5		22.17		44.1		48.72		29.2	
Sec δ, Tan δ	1.166		+0.599		1.006		+0.110		1.506		+1.126		1.023		+0.216	
Mean Place	$56^{s}.418$		$34''.52$		$47^{s}.805$		$38''.18$		$15^{s}.467$		$62''.27$		$43^{s}.855$		$42''.25$	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	+0.01		+0.03		0.00		0.00		+0.02		+0.05		0.00		+0.01	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.3		+0.7		−0.3		+0.7		−0.3		+0.7		−0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**b^1 Carinæ.** Mag. 5.1 Right Ascension.		**b^1 Carinæ.** Mag. 5.1 Declination S.		**κ Ursæ Majoris.** Mag. 3.7 Right Ascension.		**κ Ursæ Majoris.** Mag. 3.7 Declination N.		**σ^2 Ursæ Majoris.** Mag. 4.9 Right Ascension.		**σ^2 Ursæ Majoris.** Mag. 4.9 Declination N.		**κ Cancri.** Mag. 5.1 Right Ascension.		**κ Cancri.** Mag. 5.1 Declination N.	
	h m 8 54 s		° ′ −58 53 ″		h m 8 57 s		° ′ +47 29 ″		h m 9 2 s		° ′ +67 28 ″		h m 9 3 s		° ′ +11 0 ″	
Jan. 0.6	52.10		20.5		43.49		61.7		49.02		74.0		3.30		70.7	
10.6	52.35	25	24.2	37	43.81	32	62.5	8	49.52	50	75.7	17	3.54	24	69.4	13
20.5	52.51	16	28.0	38	44.07	26	63.6	11	49.91	39	77.8	21	3.73	19	68.3	11
30.5	52.59	8	31.8	38	44.26	19	65.0	14	50.19	28	80.1	23	3.87	14	67.5	8
Feb. 9.5	52.58	1	35.6	38	44.37	11	66.6	16	50.35	16	82.6	25	3.96	9	66.9	6
19.5	52.49	9	39.2	36	44.41	4	68.3	17	50.39	4	85.2	26	4.00	4	66.5	4
Mar. 1.4	52.33	16	42.5	33	44.38	3	70.0	17	50.31	8	87.7	25	3.99	1	66.3	2
11.4	52.11	22	45.4	29	44.29	9	71.7	17	50.12	19	90.1	24	3.94	5	66.3	0
21.4	51.83	28	48.0	26	44.15	14	73.3	16	49.84	28	92.3	22	3.86	8	66.4	1
31.4	51.51	32	50.1	21	43.97	18	74.7	14	49.49	35	94.1	18	3.75	11	66.6	2
Apr. 10.3	51.16	35	51.7	16	43.76	21	75.9	12	49.08	41	95.5	14	3.62	13	66.9	3
20.3	50.79	37	52.9	12	43.54	22	76.8	9	48.64	44	96.4	9	3.48	14	67.3	4
30.3	50.42	37	53.6	7	43.32	22	77.3	5	48.19	45	96.9	5	3.35	13	67.7	4
May 10.2	50.05	37	53.7	1	43.11	21	77.5	2	47.76	43	96.9	0	3.22	13	68.2	5
20.2	49.69	36	53.3	4	42.92	19	77.3	2	47.36	40	96.4	5	3.10	12	68.6	4
30.2	49.36	33	52.4	9	42.75	17	76.8	5	47.00	36	95.5	9	3.01	9	69.0	4
June 9.2	49.07	29	51.0	14	42.62	13	76.0	8	46.69	31	94.1	14	2.94	7	69.4	4
19.1	48.82	25	49.2	18	42.53	9	74.9	11	46.45	24	92.3	18	2.89	5	69.8	4
29.1	48.61	21	47.0	22	42.49	4	73.6	13	46.28	17	90.1	22	2.87	2	70.2	4
July 9.1	48.45	16	44.5	25	42.49	0	72.1	15	46.20	8	87.7	24	2.88	1	70.5	3
19.0	48.35	10	41.7	28	42.53	4	70.3	18	46.20	0	85.1	26	2.92	4	70.7	2
29.0	48.32	3	38.8	29	42.62	9	68.4	19	46.28	8	82.3	28	2.98	6	70.9	2
Aug. 8.0	48.35	3	35.8	30	42.75	13	66.4	20	46.44	16	79.3	30	3.07	9	71.0	1
18.0	48.45	10	32.8	30	42.92	17	64.3	21	46.68	24	76.3	30	3.19	12	70.9	1
27.9	48.61	16	29.9	29	43.13	21	62.2	21	47.00	32	73.3	30	3.34	15	70.7	2
Sept. 6.9	48.84	23	27.3	26	43.39	26	60.0	22	47.39	39	70.4	29	3.52	18	70.3	4
16.9	49.13	29	25.1	22	43.68	29	57.8	22	47.86	47	67.6	28	3.73	21	69.7	6
26.9	49.48	35	23.3	18	44.01	33	55.7	21	48.39	53	64.9	27	3.96	23	68.9	8
Oct. 6.8	49.88	40	22.0	13	44.38	37	53.6	21	48.98	59	62.5	24	4.22	26	67.9	10
16.8	50.33	45	21.3	7	44.78	40	51.7	19	49.63	65	60.4	21	4.50	28	66.7	12
26.8	50.81	48	21.3	0	45.20	42	50.0	17	50.32	69	58.6	18	4.81	31	65.4	13
Nov. 5.7	51.31	50	21.9	6	45.64	44	48.5	15	51.04	72	57.2	14	5.13	32	63.9	15
15.7	51.81	50	23.1	12	46.10	46	47.2	13	51.78	74	56.2	10	5.46	33	62.2	17
25.7	52.30	49	25.0	19	46.56	46	46.3	9	52.52	74	55.7	5	5.80	34	60.5	17
Dec. 5.7	52.77	47	27.5	25	47.01	45	45.7	6	53.25	73	55.6	1	6.13	33	58.8	17
15.6	53.19	42	30.4	29	47.44	43	45.5	2	53.94	69	56.0	4	6.45	32	57.1	17
25.6	53.55	36	33.7	33	47.84	40	45.7	2	54.57	63	57.0	10	6.75	30	55.5	16
35.6	53.85	30	37.3	36	48.19	35	46.2	5	55.12	55	58.4	14	7.01	26	54.1	14
Sec δ, Tan δ	1.936		−1.657		1.480		+1.091		2.612		+2.413		1.019		+0.195	
Mean Place	50ˢ.627		36″.17		41ˢ.555		64″.74		45ˢ.354		79″.21		2ˢ.213		68″.00	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	−0.03		−0.08		+0.02		+0.05		+0.04		+0.12		0.00		+0.01	
$D_\psi\,\delta$, $D_\omega\,\delta$	−0.3		+0.7		−0.3		+0.7		−0.3		+0.7		−0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	λ Argûs. Mag. 2.2				θ Hydræ. Mag. 3.8				β Argûs. Mag. 1.8				83 Cancri. Mag. 6.6			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	9 4		−43 4		9 9		+ 2 40		9 12		−69 21		9 14		+18 4	
	s		″		s		″		s		″		s		″	
Jan. 0.6	48.76	23	38.2	35	51.35	24	59.1	17	16.86	34	13.9	37	8.85	26	29.8	10
10.6	48.99	17	41.7	36	51.59	19	57.4	16	17.20	23	17.6	39	9.11	21	28.8	7
20.5	49.16	11	45.3	35	51.78	14	55.8	14	17.43	11	21.5	39	9.32	16	28.1	4
30.5	49.27	5	48.8	34	51.92	9	54.4	12	17.54	1	25.4	39	9.48	10	27.7	2
Feb. 9.5	49.32	2	52.2	32	52.01	4	53.2	9	17.53	13	29.3	38	9.58	5	27.5	0
19.5	49.30	7	55.4	29	52.05	0	52.3	7	17.40	23	33.1	36	9.63	1	27.5	2
Mar. 1.4	49.23	12	58.3	26	52.05	4	51.6	5	17.17	32	36.7	33	9.64	4	27.7	4
11.4	49.11	16	60.9	22	52.01	8	51.1	3	16.85	40	40.0	29	9.60	8	28.1	4
21.4	48.95	19	63.1	18	51.93	11	50.8	1	16.45	47	42.9	25	9.52	10	28.5	5
31.4	48.76	21	64.9	14	51.82	13	50.7	1	15.98	52	45.4	21	9.42	13	29.0	6
Apr. 10.3	48.55	23	66.3	9	51.69	13	50.8	2	15.46	56	47.5	16	9.29	14	29.6	5
20.3	48.32	23	67.2	5	51.56	13	51.0	3	14.90	57	49.1	11	9.15	14	30.1	5
30.3	48.09	23	67.7	0	51.43	12	51.3	4	14.33	57	50.2	5	9.01	13	30.6	5
May 10.2	47.86	22	67.7	5	51.31	11	51.7	5	13.76	57	50.7	0	8.88	12	31.1	4
20.2	47.64	20	67.2	9	51.20	10	52.2	6	13.19	54	50.7	5	8.76	10	31.5	3
30.2	47.44	17	66.3	13	51.10	8	52.8	6	12.64	51	50.2	11	8.66	8	31.8	2
June 9.2	47.27	14	65.0	16	51.02	5	53.4	6	12.13	45	49.1	15	8.58	5	32.0	1
19.1	47.13	11	63.4	20	50.97	3	54.0	7	11.68	39	47.6	20	8.53	3	32.1	1
29.1	47.02	7	61.4	23	50.94	0	54.7	7	11.29	32	45.6	24	8.50	0	32.2	0
July 9.1	46.95	4	59.1	24	50.94	3	55.4	7	10.97	24	43.2	26	8.50	3	32.2	2
19.1	46.91	0	56.7	26	50.97	5	56.1	6	10.73	15	40.6	29	8.53	6	32.0	3
29.0	46.91	5	54.1	27	51.02	8	56.7	5	10.58	6	37.7	31	8.59	8	31.7	4
Aug. 8.0	46.96	9	51.4	26	51.10	11	57.2	4	10.52	5	34.6	31	8.67	11	31.3	5
18.0	47.05	13	48.8	24	51.21	14	57.6	3	10.57	15	31.5	30	8.78	15	30.8	7
27.9	47.18	18	46.4	22	51.35	17	57.9	0	10.72	25	28.5	28	8.93	17	30.1	8
Sept. 6.9	47.36	22	44.2	19	51.52	19	57.9	2	10.97	36	25.7	25	9.10	20	29.3	10
16.9	47.58	26	42.3	14	51.71	22	57.7	4	11.33	45	23.2	21	9.30	24	28.3	11
26.9	47.84	30	40.9	9	51.93	25	57.3	7	11.78	53	21.1	17	9.54	26	27.2	13
Oct. 6.8	48.14	34	40.0	4	52.18	27	56.6	10	12.31	60	19.4	11	9.80	28	25.9	14
16.8	48.48	37	39.6	1	52.45	30	55.6	12	12.91	65	18.3	5	10.08	31	24.5	15
26.8	48.85	38	39.7	8	52.75	32	54.4	15	13.56	68	17.8	2	10.39	33	23.0	16
Nov. 5.8	49.23	39	40.5	14	53.07	33	52.9	17	14.24	69	18.0	9	10.72	34	21.4	17
15.7	49.62	39	41.9	19	53.40	33	51.2	19	14.93	68	18.9	15	11.06	35	19.7	17
25.7	50.01	37	43.8	24	53.73	32	49.3	19	15.61	65	20.4	21	11.41	35	18.0	16
Dec. 5.7	50.38	35	46.2	28	54.05	31	47.4	20	16.26	59	22.5	27	11.76	33	16.4	15
15.6	50.73	31	49.0	32	54.36	29	45.4	19	16.85	51	25.2	32	12.09	31	14.9	13
25.6	51.04	27	52.2	35	54.65	26	43.5	18	17.36	41	28.4	35	12.40	28	13.6	11
35.6	51.31		55.7		54.91		41.7		17.77		31.9		12.68		12.5	
Sec δ, Tan δ	1.369		−0.935		1.001		+0.047		2.837		−2.655		1.052		+0.326	
Mean Place	47ˢ.725		51″.88		50ˢ.365		54″.90		14ˢ.984		31″.56		7ˢ.717		28″.99	
$D'_\psi a$, $D_\omega a$	−0.02		−0.04		0.00		0.00		−0.05		−0.13		+0.01		+0.02	
$D_\psi \delta$, $D_\omega \delta$	−0.3		+0.7		−0.3		+0.7		−0.3		+0.7		−0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ι Argûs.** Mag. 2.2				**40 Lyncis.** Mag. 3.3				**θ Pyxidis.** Mag. 4.9				**α Hydræ.** Mag. 2.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	9 14		−58 54		9 15		+34 45		9 17		−25 35		9 23		− 8 16	
	s		″		s		″		s		″		s		″	
Jan. 0.6	46.85	28	18.9	37	47.00	29	37.4	1	39.14	23	31.9	30	19.62	24	45.0	23
10.6	47.13	21	22.6	38	47.29	24	37.3	3	39.37	19	34.9	30	19.86	20	47.3	22
20.6	47.34	12	26.4	38	47.53	18	37.6	6	39.56	13	37.9	29	20.06	15	49.5	20
30.5	47.46	3	30.2	38	47.71	12	38.2	8	39.69	8	40.8	28	20.21	10	51.5	18
Feb. 9.5	47.49	5	34.0	37	47.83	7	39.0	10	39.77	3	43.6	25	20.31	5	53.3	16
19.5	47.44	12	37.7	34	47.90	0	40.0	12	39.80	2	46.1	22	20.36	0	54.9	14
Mar. 1.4	47.32	19	41.1	31	47.90	5	41.2	12	39.78	6	48.3	20	20.36	4	56.3	11
11.4	47.13	24	44.2	28	47.85	9	42.4	12	39.72	10	50.3	16	20.32	8	57.4	8
21.4	46.89	29	47.0	24	47.76	13	43.6	11	39.62	13	51.9	13	20.24	10	58.2	6
31.4	46.60	33	49.4	19	47.63	15	44.7	11	39.49	15	53.2	9	20.14	12	58.8	3
Apr. 10.3	46.27	35	51.3	14	47.48	17	45.8	9	39.34	16	54.1	6	20.02	13	59.1	1
20.3	45.92	36	52.7	9	47.31	17	46.7	6	39.18	16	54.7	2	19.89	13	59.2	1
30.3	45.56	36	53.6	4	47.14	16	47.3	4	39.02	16	54.9	1	19.76	13	59.1	3
May 10.3	45.20	35	54.0	2	46.98	15	47.7	2	38.86	15	54.8	4	19.63	12	58.8	5
20.2	44.85	33	53.8	6	46.83	13	47.9	0	38.71	13	54.4	8	19.51	11	58.3	6
30.2	44.52	31	53.2	11	46.70	10	47.9	2	38.58	11	53.6	11	19.40	9	57.7	8
June 9.2	44.21	27	52.1	16	46.60	7	47.7	5	38.47	9	52.5	13	19.31	7	56.9	10
19.1	43.94	23	50.5	20	46.53	4	47.2	7	38.38	7	51.2	16	19.24	4	55.9	11
29.1	43.71	18	48.5	24	46.49	1	46.5	9	38.31	4	49.6	18	19.20	2	54.8	11
July 9.1	43.53	12	46.1	26	46.48	2	45.6	10	38.27	1	47.8	19	19.18	1	53.7	11
19.1	43.41	7	43.5	28	46.50	6	44.6	12	38.26	2	45.9	19	19.19	4	52.6	12
29.0	43.34	1	40.7	29	46.56	10	43.4	14	38.28	5	44.0	20	19.23	6	51.4	11
Aug. 8.0	43.33	6	37.8	30	46.66	13	42.0	15	38.33	9	42.0	19	19.29	9	50.3	10
18.0	43.39	13	34.8	29	46.79	16	40.5	16	38.42	12	40.1	17	19.38	12	49.3	9
28.0	43.52	20	31.9	27	46.95	19	38.9	17	38.54	15	38.4	15	19.50	15	48.4	6
Sept. 6.9	43.72	26	29.2	23	47.14	23	37.2	18	38.69	19	36.9	12	19.65	17	47.8	4
16.9	43.98	33	26.9	19	47.37	26	35.4	18	38.88	22	35.7	9	19.82	21	47.4	1
26.9	44.31	39	25.0	15	47.63	30	33.6	18	39.10	26	34.8	4	20.03	24	47.3	3
Oct. 6.8	44.70	43	23.5	9	47.93	32	31.8	19	39.36	28	34.4	1	20.27	27	47.6	6
16.8	45.13	47	22.6	3	48.25	35	29.9	18	39.64	31	34.5	5	20.54	29	48.2	10
26.8	45.60	50	22.3	4	48.60	37	28.1	17	39.95	33	35.0	10	20.83	31	49.2	13
Nov. 5.8	46.10	51	22.7	10	48.97	39	26.4	16	40.28	34	36.0	15	21.14	32	50.5	16
15.7	46.61	50	23.7	16	49.36	39	24.8	14	40.62	34	37.5	19	21.46	33	52.1	19
25.7	47.11	48	25.3	23	49.75	39	23.4	12	40.96	34	39.4	23	21.79	33	54.0	22
Dec. 5.7	47.59	45	27.6	28	50.14	38	22.2	9	41.30	32	41.7	26	22.12	32	56.2	23
15.7	48.04	39	30.4	32	50.52	35	21.3	5	41.62	30	44.3	28	22.44	30	58.5	23
25.6	48.43	33	33.6	34	50.87	32	20.8	3	41.92	26	47.1	30	22.74	26	60.8	24
35.6	48.76		37.0		51.19		20.5		42.18		50.1		23.00		63.2	
Sec δ, Tan δ	1.937		−1.658		1.217		+0.694		1.109		−0.479		1.011		−0.146	
Mean Place	$45^{s}.574$		$35''.35$		$45^{s}.551$		$39''.84$		$38^{s}.278$		$42''.38$		$18^{s}.756$		$51''.38$	
D′ψ α, Dω α	−0.03		−0.08		+0.01		+0.03		−0.01		−0.02		0.00		−0.01	
Dψ δ, Dω δ	−0.3		+0.7		−0.3		+0.7		−0.3		+0.7		−0.3		+0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*h* Ursæ Majoris. Mag. 3.8				*d* Ursæ Majoris. Mag. 4.6				*θ* Ursæ Majoris. Mag. 3.3				*ξ* Leonis. Mag. 5.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	9 24		+63 26		9 26		+70 12		9 27		+52 4		9 27		+11 40	
	s		″		s		″		s		″		s		″	
Jan. 0.6	44.12		27.8		52.77		41.2		4.86		22.4		16.51		69.9	
10.6	44.60	48	29.2	14	53.37	60	42.7	15	5.23	37	23.1	7	16.77	26	68.5	14
20.6	44.99	39	30.9	17	53.86	49	44.7	20	5.54	31	24.3	12	16.98	21	67.4	11
30.5	45.29	30	32.9	20	54.23	37	47.0	23	5.78	24	25.8	15	17.14	16	66.5	9
Feb. 9.5	45.48	19	35.2	23	54.46	23	49.6	26	5.94	16	27.5	17	17.26	12	65.9	6
19.5	45.57	9	37.7	25	54.56	10	52.3	27	6.02	8	29.4	19	17.33	7	65.5	4
Mar. 1.5	45.55	2	40.2	25	54.52	4	55.0	27	6.02	0	31.4	20	17.34	1	65.3	2
11.4	45.44	11	42.6	24	54.35	17	57.6	26	5.96	6	33.4	20	17.31	3	65.3	0
21.4	45.24	20	44.8	22	54.08	27	60.0	24	5.83	13	35.3	19	17.24	7	65.5	2
31.4	44.98	26	46.7	19	53.72	36	62.1	21	5.65	18	37.0	17	17.15	9	65.8	3
Apr. 10.3	44.66	32	48.3	16	53.28	44	63.8	17	5.44	21	38.5	15	17.04	11	66.2	4
20.3	44.31	35	49.5	12	52.80	48	65.0	12	5.20	24	39.7	12	16.91	13	66.6	4
30.3	43.95	36	50.3	8	52.30	50	65.8	8	4.95	25	40.5	8	16.78	13	67.0	4
May 10.3	43.59	36	50.6	3	51.79	51	66.0	2	4.71	24	40.9	4	16.65	13	67.5	5
20.2	43.24	35	50.4	2	51.30	49	65.7	3	4.48	23	40.9	0	16.53	12	68.0	5
30.2	42.92	32	49.8	6	50.85	45	65.0	7	4.27	21	40.5	4	16.43	10	68.4	4
June 9.2	42.65	27	48.7	11	50.45	40	63.8	12	4.10	17	39.8	7	16.35	8	68.8	4
19.2	42.43	22	47.2	15	50.12	33	62.1	17	3.96	14	38.8	10	16.29	6	69.2	4
29.1	42.27	16	45.4	18	49.86	26	60.0	21	3.86	10	37.4	14	16.26	3	69.5	3
July 9.1	42.17	10	43.3	21	49.69	17	57.6	24	3.80	6	35.7	17	16.25	1	69.7	2
19.1	42.13	4	40.9	24	49.61	8	55.0	26	3.79	1	33.8	19	16.26	1	69.9	2
29.0	42.16	3	38.2	27	49.61	0	52.1	29	3.83	4	31.6	22	16.30	4	70.0	1
Aug. 8.0	42.26	10	35.4	28	49.71	10	49.0	31	3.92	9	29.3	23	16.37	7	70.0	0
18.0	42.43	17	32.5	29	49.90	19	45.8	32	4.05	13	26.9	24	16.47	10	69.8	2
28.0	42.66	23	29.6	29	50.18	28	42.6	32	4.23	18	24.4	25	16.60	13	69.5	3
Sept. 6.9	42.96	30	26.6	30	50.55	37	39.5	31	4.46	23	21.8	26	16.76	16	69.0	5
16.9	43.32	36	23.7	29	51.00	45	36.4	31	4.73	27	19.2	26	16.94	18	68.3	7
26.9	43.75	43	20.9	28	51.53	53	33.4	30	5.04	31	16.7	25	17.15	21	67.4	9
Oct. 6.9	44.23	48	18.3	26	52.14	61	30.7	27	5.40	36	14.2	25	17.39	24	66.3	11
16.8	44.76	53	15.9	24	52.82	68	28.2	25	5.80	40	11.9	23	17.66	27	65.0	13
26.8	45.33	57	13.8	21	53.55	73	26.1	21	6.24	44	9.8	21	17.96	30	63.5	15
Nov. 5.8	45.94	61	12.0	18	54.33	78	24.4	17	6.70	46	8.0	18	18.28	32	61.9	16
15.7	46.58	64	10.6	14	55.14	81	23.1	13	7.18	48	6.4	16	18.61	33	60.2	17
25.7	47.23	65	9.7	9	55.97	83	22.3	8	7.68	50	5.2	12	18.95	34	58.4	18
Dec. 5.7	47.87	64	9.3	4	56.78	81	22.0	3	8.17	49	4.4	8	19.29	34	56.6	18
15.7	48.49	62	9.3	0	57.56	78	22.2	2	8.64	47	4.0	4	19.62	33	54.8	18
25.6	49.07	58	9.8	5	58.29	73	22.9	7	9.09	45	4.0	0	19.93	31	53.1	17
35.6	49.60	53	10.8	10	58.95	66	24.2	13	9.50	41	4.5	5	20.21	28	51.7	14
Sec δ, Tan δ	2.236		+2.001		2.954		+2.779		1.627		+1.283		1.021		+0.207	
Mean Place	41ˢ.126		34″.74		48ˢ.737		48″.73		2ˢ.793		28″.28		15ˢ.499		68″.27	
D′ψ α, Dω α	+0.03		+0.10		+0.05		+0.15		+0.02		+0.07		0.00		+0.01	
Dψ δ, Dω δ	−0.3		+0.6		−0.3		+0.6		−0.3		+0.6		−0.3		+0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ψ Argûs.** Mag. 3.6				**10 Leonis Minoris.** Mag. 4.6				**ζ Chamæleontis.** Mag. 5.2				**ο Leonis.** Mag. 3.8			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	9 27		−40 4		9 28		+36 46		9 36		−80 32		9 36		+10 17	
	s		″		s		″		s		″		s		″	
Jan. 0.6	17.10		55.0		55.36		60.4		32.15		42.5		31.51		20.9	
10.6	17.36	26	58.4	34	55.67	31	60.4	0	32.87	72	45.9	34	31.77	26	19.5	14
20.6	17.56	20	61.9	35	55.93	26	60.7	3	33.37	50	49.6	37	31.99	22	18.3	12
30.5	17.70	14	65.3	34	56.13	20	61.3	6	33.64	27	53.5	39	32.16	17	17.3	10
Feb. 9.5	17.78	8	68.6	33	56.27	14	62.2	9	33.67	3	57.4	39	32.28	12	16.5	8
19.5	17.80	2	71.8	32	56.35	8	63.3	11	33.46	21	61.3	39	32.36	8	16.0	5
Mar. 1.5	17.77	3	74.7	29	56.37	2	64.6	13	33.03	43	65.1	38	32.39	3	15.7	3
11.4	17.69	8	77.3	26	56.33	4	65.9	13	32.40	63	68.7	36	32.37	2	15.7	0
21.4	17.56	13	79.6	23	56.25	8	67.3	14	31.59	81	72.0	33	32.31	6	15.8	1
31.4	17.40	16	81.5	19	56.13	12	68.6	13	30.63	96	75.0	30	32.22	9	16.0	2
Apr. 10.3	17.22	18	83.0	15	55.98	15	69.7	11	29.53	110	77.6	26	32.11	11	16.3	3
20.3	17.02	20	84.1	11	55.82	16	70.7	10	28.33	120	79.7	21	31.99	12	16.7	4
30.3	16.82	20	84.7	6	55.65	17	71.5	8	27.07	126	81.3	16	31.86	13	17.2	5
May 10.3	16.61	21	84.9	2	55.48	17	72.0	5	25.77	130	82.4	11	31.74	12	17.7	5
20.2	16.41	20	84.7	2	55.33	15	72.3	3	24.45	132	82.9	5	31.63	11	18.2	5
30.2	16.23	18	84.0	7	55.19	14	72.3	0	23.15	130	82.9	0	31.53	10	18.7	5
June 9.2	16.07	16	82.9	11	55.08	11	72.1	2	21.91	124	82.4	5	31.44	9	19.1	4
19.2	15.93	14	81.5	14	54.99	9	71.6	5	20.75	116	81.4	10	31.37	7	19.5	4
29.1	15.81	12	79.8	17	54.93	6	70.8	8	19.69	106	79.9	15	31.33	4	19.9	4
July 9.1	15.72	9	77.8	20	54.91	2	69.8	10	18.78	91	77.9	20	31.31	2	20.2	3
19.1	15.67	5	75.5	23	54.92	1	68.7	11	18.03	75	75.5	24	31.32	1	20.4	2
29.0	15.66	1	73.1	24	54.96	4	67.4	13	17.47	56	72.8	27	31.35	3	20.6	2
Aug. 8.0	15.68	2	70.6	25	55.04	8	65.9	15	17.11	36	69.9	29	31.41	6	20.6	0
18.0	15.74	6	68.2	24	55.15	11	64.3	16	16.97	14	66.8	31	31.50	9	20.5	1
28.0	15.85	11	65.8	24	55.30	15	62.5	18	17.07	10	63.8	30	31.61	11	20.2	3
Sept. 6.9	16.00	15	63.7	21	55.49	19	60.6	19	17.40	33	60.8	30	31.75	14	19.8	4
16.9	16.19	19	61.9	18	55.71	22	58.7	19	17.96	56	58.0	28	31.93	18	19.2	6
26.9	16.43	24	60.4	15	55.96	25	56.7	20	18.73	77	55.5	25	32.14	21	18.4	8
Oct. 6.9	16.71	28	59.4	10	56.25	29	54.7	20	19.70	97	53.5	20	32.38	24	17.3	11
16.8	17.02	31	58.9	5	56.57	32	52.7	20	20.84	114	52.0	15	32.64	26	16.0	13
26.8	17.36	34	59.0	1	56.92	35	50.7	20	22.11	127	51.0	10	32.93	29	14.5	15
Nov. 5.8	17.72	36	59.6	6	57.30	38	48.8	19	23.46	135	50.7	3	33.24	31	12.9	16
15.7	18.10	38	60.8	12	57.69	39	47.1	17	24.85	139	51.0	3	33.57	33	11.1	18
25.7	18.48	38	62.6	18	58.09	40	45.6	15	26.22	137	52.0	10	33.91	34	9.3	18
Dec. 5.7	18.86	38	64.9	23	58.49	40	44.4	12	27.53	131	53.7	17	34.25	34	7.4	19
15.7	19.22	36	67.6	27	58.88	39	43.5	9	28.73	120	55.9	22	34.58	33	5.6	18
25.6	19.55	33	70.6	30	59.25	37	42.9	6	29.78	105	58.6	27	34.89	31	3.8	18
35.6	19.83	28	73.9	33	59.59	34	42.6	3	30.65	87	61.8	32	35.17	28	2.2	16
Sec δ, Tan δ	1.307		−0.842		1.249		+0.748		6.091		−6.008		1.016		+0.182	
Mean Place	16ˢ.244		68″.59		53ˢ.911		64″.04		28ˢ.953		61″.95		30ˢ.550		19″.38	
$D'_\psi \alpha$, $D_\omega \alpha$	−0.01		−0.04		+0.01		+0.04		−0.09		−0.32		0.00		+0.01	
$D_\psi \delta$, $D_\omega \delta$	−0.3		+0.6		−0.3		+0.6		−0.3		+0.6		−0.3		+0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**θ Antliæ.** Mag. 5.0				**ε Leonis.** Mag. 3.1				**υ Ursæ Majoris.** Mag. 3.9				**υ Argûs.** Mag. 3.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	9 40		−27 22		9 40		+24 10		9 44		+59 26		9 44		−64 39	
	s		″		s		″		s		″		s		″	
Jan. 0.6	20.13		3.8		56.08		29.1		51.35		46.6		56.82		47.9	
10.6	20.38	25	6.8	30	56.37	29	28.3	8	51.81	46	47.5	9	57.19	37	51.4	35
20.6	20.59	21	9.8	30	56.61	24	27.9	4	52.19	38	48.9	14	57.48	29	55.1	37
30.5	20.75	16	12.8	30	56.80	19	27.7	2	52.49	30	50.6	17	57.67	19	59.0	39
Feb. 9.5	20.86	11	15.7	29	56.94	14	27.8	1	52.70	21	52.7	21	57.77	10	62.9	39
19.5	20.91	5	18.3	26	57.03	9	28.1	3	52.82	12	55.0	23	57.77	0	66.8	39
Mar. 1.5	20.91	0	20.7	24	57.06	3	28.7	6	52.85	3	57.3	23	57.68	9	70.5	37
11.4	20.87	4	22.8	21	57.05	1	29.4	7	52.79	6	59.7	24	57.51	17	74.0	35
21.4	20.79	8	24.6	18	56.99	6	30.2	8	52.66	13	61.9	22	57.26	25	77.1	31
31.4	20.68	11	26.1	15	56.90	9	31.1	9	52.46	20	63.9	20	56.95	31	79.9	28
Apr. 10.4	20.55	13	27.3	12	56.78	12	31.9	8	52.21	25	65.6	17	56.59	36	82.3	24
20.3	20.40	15	28.1	8	56.65	13	32.7	8	51.92	29	67.0	14	56.19	40	84.2	19
30.3	20.24	16	28.5	4	56.51	14	33.4	7	51.62	30	68.0	10	55.77	42	85.6	14
May 10.3	20.09	15	28.6	1	56.37	14	34.0	6	51.31	31	68.6	6	55.34	43	86.5	9
20.2	19.94	15	28.3	3	56.24	13	34.5	5	51.01	30	68.7	1	54.91	43	86.9	4
30.2	19.80	14	27.7	6	56.13	11	34.8	3	50.73	28	68.4	3	54.48	43	86.8	1
June 9.2	19.67	13	26.8	9	56.03	10	34.9	1	50.48	25	67.6	8	54.07	41	86.1	7
19.2	19.56	11	25.6	12	55.96	7	34.9	0	50.28	20	66.4	12	53.70	37	84.9	12
29.1	19.48	8	24.1	15	55.91	5	34.7	2	50.12	16	64.9	15	53.37	33	83.3	16
July 9.1	19.42	6	22.4	17	55.88	3	34.4	3	50.01	11	63.0	19	53.09	28	81.2	21
19.1	19.39	3	20.6	18	55.88	0	33.9	5	49.95	6	60.8	22	52.86	23	78.8	24
29.1	19.39	0	18.7	19	55.92	4	33.3	6	49.95	0	58.4	24	52.70	16	76.1	27
Aug. 8.0	19.42	3	16.7	20	55.98	6	32.5	8	50.00	5	55.8	26	52.61	9	73.3	28
18.0	19.48	6	14.8	19	56.07	9	31.6	9	50.11	11	53.0	28	52.60	1	70.3	30
28.0	19.58	10	13.0	18	56.19	12	30.5	11	50.28	17	50.1	29	52.68	8	67.3	30
Sept. 6.9	19.71	13	11.4	16	56.34	15	29.3	12	50.51	23	47.2	29	52.84	16	64.5	28
16.9	19.88	17	10.1	13	56.53	19	27.9	14	50.80	29	44.3	29	53.08	24	61.9	26
26.9	20.08	20	9.1	10	56.75	22	26.3	16	51.14	34	41.4	29	53.41	33	59.6	23
Oct. 6.9	20.32	24	8.5	6	56.99	24	24.7	16	51.53	39	38.6	28	53.82	41	57.7	19
16.8	20.59	27	8.3	2	57.27	28	23.0	17	51.97	44	36.0	26	54.29	47	56.3	14
26.8	20.90	31	8.7	4	57.58	31	21.2	18	52.46	49	33.7	23	54.82	53	55.6	7
Nov. 5.8	21.23	33	9.6	9	57.91	33	19.3	19	52.99	53	31.6	21	55.39	57	55.5	1
15.8	21.57	34	10.9	13	58.26	35	17.4	19	53.55	56	29.9	17	55.98	59	56.1	6
25.7	21.92	35	12.7	18	58.62	36	15.6	18	54.12	57	28.6	13	56.58	60	57.3	12
Dec. 5.7	22.27	35	14.9	22	58.98	36	14.0	16	54.70	58	27.8	8	57.17	59	59.1	18
15.7	22.61	34	17.4	25	59.34	36	12.6	14	55.27	57	27.4	4	57.72	55	61.5	24
25.6	22.93	32	20.2	28	59.68	34	11.4	12	55.81	54	27.5	1	58.22	50	64.4	29
35.6	23.21	28	23.2	30	59.99	31	10.4	10	56.30	49	28.1	6	58.65	43	67.8	34
Sec δ, Tan δ	1.126		−0.518		1.096		+0.449		1.967		+1.694		2.337		−2.112	
Mean Place	$19^{s}.388$		$14''.61$		$54^{s}.949$		$31''.00$		$48^{s}.866$		$54''.81$		$55^{s}.686$		$65''.98$	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	−0.01		−0.03		+0.01		+0.02		+0.02		+0.09		−0.03		−0.12	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.3		+0.6		−0.3		+0.6		−0.3		+0.6		−0.3		+0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**6 Sextantis.** Mag. 6.0				**μ Leonis.** Mag. 4.1				**Groombridge 1586.** Mag. 6.0				**19 Leonis Minoris.** Mag. 5.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	9 46		− 3 50		9 47		+26 24		9 50		+73 17		9 52		+41 27	
	s		″		s		″		s		″		s		″	
Jan. 0.6	51.83	26	1.6	22	50.23	30	59.2	7	42.44	74	27.9	15	23.15	35	67.7	0
10.6	52.09	22	3.8	20	50.53	25	58.5	4	43.18	62	29.4	19	23.50	30	67.7	4
20.6	52.31	17	5.8	18	50.78	20	58.1	0	43.80	49	31.3	23	23.80	24	68.1	8
30.5	52.48	12	7.6	16	50.98	15	58.1	2	44.29	33	33.6	26	24.04	17	68.9	11
Feb. 9.5	52.60	8	9.2	14	51.13	9	58.3	5	44.62	18	36.2	27	24.21	11	70.0	14
19.5	52.68	3	10.6	12	51.22	4	58.8	7	44.80	2	38.9	28	24.32	4	71.4	15
Mar. 1.5	52.71	1	11.8	9	51.26	1	59.5	8	44.82	13	41.7	28	24.36	1	72.9	16
11.4	52.70	5	12.7	7	51.25	5	60.3	9	44.69	27	44.5	26	24.35	6	74.5	17
21.4	52.65	8	13.4	4	51.20	9	61.2	10	44.42	39	47.1	23	24.29	11	76.2	16
31.4	52.57	10	13.8	2	51.11	11	62.2	9	44.03	48	49.4	19	24.18	14	77.8	14
Apr. 10.4	52.47	12	14.0	0	51.00	13	63.1	9	43.55	55	51.3	15	24.04	17	79.2	12
20.3	52.35	12	14.0	1	50.87	14	64.0	8	43.00	59	52.8	10	23.87	18	80.4	10
30.3	52.23	12	13.9	3	50.73	14	64.8	6	42.41	61	53.8	5	23.69	18	81.4	7
May 10.3	52.11	12	13.6	5	50.59	14	65.4	5	41.80	60	54.3	0	23.51	18	82.1	4
20.2	51.99	11	13.1	6	50.45	12	65.9	3	41.20	57	54.3	5	23.33	16	82.5	1
30.2	51.88	9	12.5	7	50.33	10	66.2	1	40.63	53	53.8	11	23.17	14	82.6	2
June 9.2	51.79	7	11.8	7	50.23	8	66.3	1	40.10	46	52.7	15	23.03	11	82.4	5
19.2	51.72	5	11.1	8	50.15	6	66.2	2	39.64	38	51.2	20	22.92	9	81.9	8
29.1	51.67	3	10.3	9	50.09	3	66.0	4	39.26	29	49.2	24	22.83	6	81.1	11
July 9.1	51.64	1	9.4	9	50.06	0	65.6	6	38.97	19	46.8	27	22.77	2	80.0	13
19.1	51.63	2	8.5	9	50.06	3	65.0	8	38.78	9	44.1	29	22.75	1	78.7	16
29.1	51.65	4	7.6	8	50.09	5	64.2	9	38.69	1	41.2	32	22.76	5	77.1	18
Aug. 8.0	51.69	7	6.8	7	50.14	8	63.3	11	38.70	12	38.0	33	22.81	9	75.3	19
18.0	51.76	10	6.1	6	50.22	11	62.2	12	38.82	23	34.7	33	22.90	13	73.4	20
28.0	51.86	13	5.5	3	50.33	15	61.0	14	39.05	34	31.4	34	23.03	16	71.4	22
Sept. 6.9	51.99	16	5.2	1	50.48	18	59.6	15	39.39	44	28.0	33	23.19	20	69.2	23
16.9	52.15	19	5.1	1	50.66	21	58.1	16	39.83	54	24.7	32	23.39	24	66.9	23
26.9	52.34	22	5.2	4	50.87	25	56.5	18	40.37	63	21.5	30	23.63	28	64.6	24
Oct. 6.9	52.56	25	5.6	8	51.12	28	54.7	19	41.00	72	18.5	28	23.91	31	62.2	23
16.8	52.81	28	6.4	11	51.40	30	52.8	19	41.72	80	15.7	25	24.22	35	59.9	23
26.8	53.09	30	7.5	14	51.70	33	50.9	19	42.52	86	13.2	21	24.57	38	57.6	21
Nov. 5.8	53.39	32	8.9	17	52.03	35	49.0	19	43.38	91	11.1	16	24.95	41	55.5	19
15.8	53.71	33	10.6	19	52.38	37	47.1	18	44.29	94	9.5	11	25.36	42	53.6	17
25.7	54.04	34	12.5	20	52.75	37	45.3	17	45.23	94	8.4	6	25.78	42	51.9	14
Dec. 5.7	54.38	33	14.5	22	53.12	36	43.6	14	46.17	92	7.8	0	26.20	42	50.5	10
15.7	54.71	31	16.7	23	53.48	35	42.2	12	47.09	87	7.8	5	26.62	40	49.5	6
25.6	55.02	28	19.0	22	53.83	32	41.0	9	47.96	79	8.3	11	27.02	37	48.9	2
35.6	55.30		21.2		54.15		40.1		48.75		9.4		27.39		48.7	
Sec δ, Tan δ	1.002		−0.067		1.117		+0.497		3.478		+3.331		1.335		+0.884	
Mean Place	51ˢ.038		6″.43		49ˢ.087		61″.96		37ˢ.874		37″.77		21ˢ.658		73″.82	
D′ψ α, Dω α	0.00		0.00		+0.01		+0.03		+0.05		+0.19		+0.01		+0.05	
Dψ δ, Dω δ	−0.3		+0.5		−0.3		+0.5		−0.3		+0.5		−0.3		+0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	φ Argûs. Mag. 3.7				π Leonis. Mag. 4.9				η Leonis. Mag. 3.6				α Leonis. Mag. 1.3			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 9 53		° ′ −54 8		h m 9 55		° ′ + 8 27		h m 10 2		° ′ +17 10		h m 10 3		° ′ +12 23	
	s		″		s		″		s		″		s		″	
Jan. 0.6	49.14		56.0		37.89		44.7		36.34		73.1		45.29		34.0	
10.6	49.46	32	59.5	35	38.17	28	43.1	16	36.63	29	71.9	12	45.58	29	32.5	15
20.6	49.72	26	63.1	36	38.40	23	41.7	14	36.88	25	71.0	9	45.83	25	31.3	12
30.6	49.91	19	66.8	37	38.59	19	40.6	11	37.09	21	70.3	7	46.03	20	30.4	9
Feb. 9.5	50.03	12	70.6	38	38.73	14	39.7	9	37.25	16	69.9	4	46.18	15	29.7	7
19.5	50.08	5	74.3	37	38.82	9	39.0	7	37.35	10	69.8	1	46.28	10	29.3	4
Mar. 1.5	50.05	3	77.8	35	38.86	4	38.6	4	37.40	5	69.9	1	46.33	5	29.1	2
11.4	49.96	9	81.1	33	38.86	0	38.4	2	37.41	1	70.2	3	46.34	1	29.1	0
21.4	49.82	14	84.0	29	38.82	4	38.4	0	37.37	4	70.7	5	46.31	3	29.3	2
31.4	49.63	19	86.6	26	38.75	7	38.6	2	37.30	7	71.3	6	46.24	7	29.7	4
Apr. 10.4	49.40	23	88.8	22	38.66	9	38.9	3	37.20	10	72.0	7	46.15	9	30.2	5
20.3	49.14	26	90.5	17	38.55	11	39.3	4	37.09	11	72.7	7	46.04	11	30.7	5
30.3	48.86	28	91.8	13	38.43	12	39.7	4	36.97	12	73.3	6	45.92	12	31.2	5
May 10.3	48.58	28	92.6	8	38.31	12	40.2	5	36.85	12	73.9	6	45.80	12	31.8	6
20.3	48.30	28	92.9	3	38.20	11	40.7	5	36.73	12	74.4	5	45.68	12	32.3	5
30.2	48.02	28	92.7	2	38.09	11	41.2	5	36.62	11	74.9	5	45.57	11	32.8	5
June 9.2	47.76	26	92.0	7	38.00	9	41.7	5	36.52	10	75.3	4	45.48	9	33.3	5
19.2	47.52	24	90.8	12	37.93	7	42.2	5	36.44	8	75.6	3	45.41	7	33.7	4
29.1	47.30	22	89.2	16	37.87	6	42.6	4	36.38	6	75.7	1	45.35	6	34.0	3
July 9.1	47.12	18	87.3	19	37.84	3	43.0	4	36.35	3	75.7	0	45.31	4	34.2	2
19.1	46.98	14	85.0	23	37.83	1	43.3	3	36.34	1	75.6	1	45.29	2	34.3	1
29.1	46.89	9	82.5	25	37.85	2	43.5	2	36.35	1	75.3	3	45.30	1	34.3	0
Aug. 8.0	46.84	5	79.8	27	37.89	4	43.6	1	36.39	4	74.9	4	45.34	4	34.2	1
18.0	46.85	1	77.0	28	37.96	7	43.6	0	36.45	6	74.4	5	45.40	6	33.9	3
28.0	46.92	7	74.2	28	38.06	10	43.4	2	36.54	9	73.7	7	45.49	9	33.4	5
Sept. 7.0	47.05	13	71.6	26	38.18	12	43.0	4	36.66	12	72.8	9	45.61	12	32.8	6
16.9	47.23	18	69.2	24	38.33	15	42.4	6	36.82	16	71.7	11	45.76	15	32.0	8
26.9	47.48	25	67.1	21	38.52	19	41.6	8	37.01	19	70.4	13	45.94	18	31.0	10
Oct. 6.9	47.79	31	65.5	16	38.74	22	40.6	10	37.23	22	69.0	14	46.15	21	29.8	12
16.8	48.15	36	64.4	11	38.99	25	39.4	12	37.48	25	67.4	16	46.40	25	28.4	14
26.8	48.55	40	63.8	6	39.27	28	37.9	15	37.76	28	65.6	18	46.68	28	26.8	16
Nov. 5.8	48.99	44	63.8	0	39.57	30	36.2	17	38.07	31	63.7	19	46.98	30	25.0	18
15.8	49.45	46	64.5	7	39.90	33	34.4	18	38.40	33	61.8	19	47.30	32	23.1	19
25.7	49.92	47	65.8	13	40.24	34	32.5	19	38.75	35	59.9	19	47.64	34	21.1	20
Dec. 5.7	50.39	47	67.7	19	40.58	34	30.5	20	39.10	35	58.0	19	47.99	35	19.2	19
15.7	50.84	45	70.2	25	40.91	33	28.6	19	39.45	35	56.2	18	48.33	34	17.3	19
25.7	51.25	41	73.1	29	41.23	32	26.7	19	39.78	33	54.6	16	48.66	33	15.5	18
35.6	51.61	36	76.3	32	41.53	30	24.9	18	40.09	31	53.2	14	48.96	30	13.9	16
Sec δ, Tan δ	1.708		−1.384		1.011		+0.149		1.047		+0.309		1.024		+0.220	
Mean Place	$48^{s}.353$		72″.68		$37^{s}.031$		43″.48		$35^{s}.406$		74″.47		$44^{s}.428$		34″.10	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	−0.02		−0.08		0.00		+0.01		0.00		+0.02		0.00		+0.01	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.3		+0.5		−0.3		+0.5		−0.3		+0.5		−0.3		+0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**λ Hydræ.** Mag. 3.8				**q Velorum.** Mag. 4.1				**38 Ursæ Majoris.** Mag. 5.7				**ζ Leonis.** Mag. 3.6			
	Right Ascension		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	10 6		−11 55		10 11		−41 41		10 11		+65 32		10 11		+23 50	
	s		″		s		″		s		″		s		″	
Jan. 0.6	21.45		18.4		5.39		11.8		46.78		23.3		52.26		61.1	
		28		25		31		32		57		9		31		10
10.6	21.73		20.9		5.70		15.0		47.35		24.2		52.57		60.1	
		23		25		26		34		50		14		27		6
20.6	21.96		23.4		5.96		18.4		47.85		25.6		52.84		59.5	
		19		23		20		35		41		19		22		3
30.6	22.15		25.7		6.16		21.9		48.26		27.5		53.06		59.2	
		14		21		14		34		30		22		17		0
Feb. 9.5	22.29		27.8		6.30		25.3		48.56		29.7		53.23		59.2	
		9		19		8		33		19		24		12		3
19.5	22.38		29.7		6.38		28.6		48.75		32.1		53.35		59.5	
		4		16		3		31		8		26		7		5
Mar. 1.5	22.42		31.3		6.41		31.7		48.83		34.7		53.42		60.0	
		0		14		3		29		3		26		1		7
11.5	22.42		32.7		6.38		34.6		48.80		37.3		53.43		60.7	
		3		11		7		26		13		25		3		8
21.4	22.39		33.8		6.31		37.2		48.67		39.8		53.40		61.5	
		7		9		11		23		21		23		7		9
31.4	22.32		34.7		6.20		39.5		48.46		42.1		53.33		62.4	
		9		6		15		19		28		21		9		10
Apr. 10.4	22.23		35.3		6.05		41.4		48.18		44.2		53.24		63.4	
		11		4		17		15		33		17		11		9
20.3	22.12		35.7		5.88		42.9		47.85		45.9		53.13		64.3	
		12		1		18		11		37		13		12		9
30.3	22.00		35.8		5.70		44.0		47.48		47.2		53.01		65.2	
		12		1		19		7		39		9		13		7
May 10.3	21.88		35.7		5.51		44.7		47.09		48.1		52.88		65.9	
		12		3		19		2		39		3		13		6
20.3	21.76		35.4		5.32		44.9		46.70		48.4		52.75		66.5	
		12		5		19		2		38		2		12		4
30.2	21.64		34.9		5.13		44.7		46.32		48.2		52.63		66.9	
		10		7		18		6		35		6		10		3
June 9.2	21.54		34.2		4.95		44.1		45.97		47.6		52.53		67.2	
		9		8		17		10		31		11		9		1
19.2	21.45		33.4		4.78		43.1		45.66		46.5		52.44		67.3	
		7		10		14		14		27		15		7		1
29.2	21.38		32.4		4.64		41.7		45.39		45.0		52.37		67.2	
		5		11		12		17		21		19		5		2
July 9.1	21.33		31.3		4.52		40.0		45.18		43.1		52.32		67.0	
		3		12		10		20		15		23		2		4
19.1	21.30		30.1		4.42		38.0		45.03		40.8		52.30		66.6	
		0		12		6		22		8		26		0		6
29.1	21.30		28.9		4.36		35.8		44.95		38.2		52.30		66.0	
		2		12		3		23		2		28		3		8
Aug. 8.0	21.32		27.7		4.33		33.5		44.93		35.4		52.33		65.2	
		5		11		1		24		5		31		6		10
18.0	21.37		26.6		4.34		31.1		44.98		32.3		52.39		64.2	
		7		9		6		24		12		32		8		11
28.0	21.44		25.7		4.40		28.7		45.10		29.1		52.47		63.1	
		11		8		10		22		20		32		12		13
Sept. 7.0	21.55		24.9		4.50		26.5		45.30		25.9		52.59		61.8	
		14		6		14		20		27		33		15		15
16.9	21.69		24.3		4.64		24.5		45.57		22.6		52.74		60.3	
		17		3		19		17		35		32		18		16
26.9	21.86		24.0		4.83		22.8		45.92		19.4		52.92		58.7	
		21		1		24		13		41		81		22		18
Oct. 6.9	22.07		24.1		5.07		21.5		46.33		16.3		53.14		56.9	
		24		4		28		8		48		30		25		19
16.9	22.31		24.5		5.35		20.7		46.81		13.3		53.39		55.0	
		27		8		33		3		54		27		29		20
26.8	22.58		25.3		5.68		20.4		47.35		10.6		53.68		53.0	
		30		12		36		2		60		23		32		20
Nov. 5.8	22.88		26.5		6.04		20.6		47.95		8.3		54.00		51.0	
		32		15		38		8		64		20		34		20
15.8	23.20		28.0		6.42		21.4		48.59		6.3		54.34		49.0	
		33		18		40		13		67		16		36		20
25.7	23.53		29.8		6.82		22.7		49.26		4.7		54.70		47.0	
		34		21		40		19		68		11		36		19
Dec. 5.7	23.87		31.9		7.22		24.6		49.94		3.6		55.06		45.1	
		33		23		39		24		68		5		36		17
15.7	24.20		34.2		7.61		27.0		50.62		3.1		55.42		43.4	
		32		24		37		28		65		0		35		14
25.7	24.52		36.6		7.98		29.8		51.27		3.1		55.77		42.0	
		30		25		33		31		61		6		33		12
35.6	24.82		39.1		8.31		32.9		51.88		3.7		56.10		40.8	
Sec δ, Tan δ	1.022		−0.211		1.339		−0.891		2.415		+2.198		1.093		+0.442	
Mean Place	$20^{s}.805$		$25''.00$		$4^{s}.835$		$26''.10$		$43^{s}.864$		$34''.32$		$51^{s}.269$		$64''.61$	
$D'_{\psi}\,a$, $D_{\omega}\,a$	0.00		−0.01		−0.01		−0.05		+0.03		+0.13		+0.01		+0.03	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.3		+0.5		−0.4		+0.5		−0.4		+0.5		−0.4		+0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**λ Ursæ Majoris.** Mag. 3.5				**γ Leonis *pr.*** Mag. 2.6				**μ Ursæ Majoris.** Mag. 3.2				**30 H. Ursæ Majoris.** Mag. 4.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 10 11		° ′ +43 20		h m 10 15		° ′ +20 16		h m 10 17		° ′ +41 55		h m 10 17		° ′ +65 59	
	s		″		s		″		s		″		s		″	
Jan. 0.6	52.84		49.7		11.62		52.6		10.49		67.0		55.64		73.1	
10.6	53.21	37	49.6	1	11.92	30	51.4	12	10.86	37	66.8	2	56.23	59	73.9	8
20.6	53.53	32	50.0	4	12.18	26	50.5	9	11.18	32	67.1	3	56.74	51	75.3	14
30.6	53.79	26	50.8	8	12.40	22	50.0	5	11.45	27	67.8	7	57.16	42	77.1	18
Feb. 9.5	53.99	20	51.9	11	12.57	17	49.8	2	11.66	21	68.8	10	57.48	32	79.3	22
19.5	54.13	14	53.3	14	12.69	12	49.8	0	11.80	14	70.1	13	57.69	21	81.7	24
Mar. 1.5	54.20	7	54.9	16	12.76	7	50.1	3	11.88	8	71.6	15	57.79	10	84.3	26
11.5	54.21	1	56.7	18	12.78	2	50.6	5	11.89	1	73.3	17	57.77	2	87.0	27
21.4	54.16	5	58.5	18	12.76	2	51.3	7	11.85	4	75.1	18	57.65	12	89.6	26
31.4	54.07	9	60.2	17	12.70	6	52.0	7	11.76	9	76.8	17	57.44	21	92.0	24
Apr. 10.4	53.94	13	61.8	16	12.62	8	52.8	8	11.64	12	78.4	16	57.16	28	94.1	21
20.3	53.78	16	63.2	14	12.51	11	53.6	8	11.49	15	79.8	14	56.83	33	95.9	18
30.3	53.60	18	64.4	12	12.39	12	54.4	8	11.32	17	81.0	12	56.46	37	97.2	13
May 10.3	53.41	19	65.3	9	12.26	13	55.1	7	11.14	18	81.9	9	56.06	40	98.1	9
20.3	53.23	18	65.9	6	12.14	12	55.7	6	10.97	17	82.5	6	55.66	40	98.5	4
30.2	53.06	17	66.1	2	12.03	11	56.2	5	10.80	17	82.8	3	55.27	39	98.4	1
June 9.2	52.90	16	66.0	1	11.93	10	56.5	3	10.65	15	82.8	0	54.91	36	97.9	5
19.2	52.77	13	65.6	4	11.84	9	56.7	2	10.52	13	82.4	4	54.59	32	96.9	10
29.2	52.66	11	64.8	8	11.77	7	56.8	1	10.41	11	81.7	7	54.31	28	95.4	15
July 9.1	52.58	8	63.7	11	11.73	4	56.7	1	10.33	8	80.7	10	54.08	23	93.5	19
19.1	52.53	5	62.3	14	11.71	2	56.4	3	10.28	5	79.5	12	53.91	17	91.2	23
29.1	52.52	1	60.7	16	11.71	0	56.0	4	10.26	2	78.0	15	53.81	10	88.6	26
Aug. 8.0	52.54	2	58.9	18	11.73	2	55.4	6	10.28	2	76.3	17	53.78	3	85.8	28
18.0	52.60	6	56.9	20	11.78	5	54.7	7	10.33	5	74.3	20	53.82	4	82.7	31
28.0	52.70	10	54.7	22	11.87	9	53.8	9	10.42	9	72.2	21	53.93	11	79.5	32
Sept. 7.0	52.84	14	52.3	24	11.98	11	52.7	11	10.55	13	69.9	23	54.11	18	76.2	33
16.9	53.02	18	49.8	25	12.12	14	51.4	13	10.72	17	67.5	24	54.37	26	72.9	33
26.9	53.24	22	47.3	25	12.30	18	49.9	15	10.93	21	65.0	25	54.70	33	69.7	32
Oct. 6.9	53.50	26	44.8	25	12.51	21	48.2	17	11.18	25	62.5	25	55.10	40	66.5	32
16.9	53.80	30	42.3	25	12.76	25	46.4	18	11.47	29	59.9	26	55.58	48	63.5	30
26.8	54.14	34	39.8	25	13.04	28	44.5	19	11.80	33	57.4	25	56.12	54	60.7	28
Nov. 5.8	54.52	38	37.5	23	13.35	31	42.5	20	12.16	36	55.1	23	56.72	60	58.2	25
15.8	54.92	40	35.4	21	13.68	33	40.5	20	12.55	39	52.9	22	57.36	64	56.1	21
25.7	55.34	42	33.6	18	14.03	35	38.5	20	12.96	41	51.0	19	58.03	67	54.5	16
Dec. 5.7	55.77	43	32.0	16	14.39	36	36.6	19	13.39	43	49.4	16	58.72	69	53.3	12
15.7	56.20	43	30.8	12	14.74	35	34.8	18	13.82	43	48.1	13	59.41	69	52.7	6
25.7	56.62	42	30.0	8	15.08	34	33.2	16	14.23	41	47.2	9	60.08	67	52.7	0
35.6	57.01	39	29.7	3	15.41	33	31.9	13	14.62	39	46.8	4	60.70	62	53.2	5
Sec δ, Tan δ	1.375		+0.944		1.066		+0.369		1.344		+0.898		2.459		+2.246	
Mean Place	$51^{\mathrm{s}}.373$		57″.55		$10^{\mathrm{s}}.692$		55″ 27		$9^{\mathrm{s}}.103$		74″.90		$52^{\mathrm{s}}.714$		84″.67	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	+0.01		+0.06		0.00		+0.02		+0.01		+0.05		+0.03		+0.14	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.4		+0.5		−0.4		+0.4		−0.4		+0.4		−0.4		+0.4	

Mean Solar Date.	**μ Hydræ.** Mag. 4.1				**31 Leonis Minoris.** Mag. 4.4				**α Antliæ.** Mag. 4.4				**36 Ursæ Majoris.** Mag. 4.8			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 10 21 s		° ′ −16 23 ″		h m 10 22 s		° ′ +37 8 ″		h m 10 23 s		° ′ −30 37 ″		h m 10 25 s		° ′ +56 25 ″	
Jan. 0.7	53.48	28	22.8	27	52.68	35	64.7	5	10.62	30	17.8	30	6.13	47	26.4	4
10.6	53.76	25	25.5	26	53.03	31	64.2	0	10.92	25	20.8	30	6.60	41	26.8	9
20.6	54.01	20	28.1	25	53.34	26	64.2	4	11.17	21	23.8	31	7.01	34	27.7	13
30.6	54.21	16	30.6	23	53.60	20	64.6	7	11.38	16	26.9	30	7.35	26	29.0	17
Feb. 9.5	54.37	11	32.9	22	53.80	14	65.3	10	11.54	11	29.9	29	7.61	18	30.7	20
19.5	54.48	6	35.1	20	53.94	8	66.3	13	11.65	5	32.8	27	7.79	10	32.7	22
Mar. 1.5	54.54	1	37.1	17	54.02	3	67.6	15	11.70	0	35.5	25	7.89	2	34.9	23
11.5	54.55	3	38.8	14	54.05	2	69.1	15	11.70	4	38.0	22	7.91	6	37.2	24
21.4	54.52	6	40.2	11	54.03	7	70.6	15	11.66	7	40.2	18	7.85	13	39.6	22
31.4	54.46	8	41.3	9	53.96	11	72.1	15	11.59	10	42.0	15	7.72	18	41.8	20
Apr. 10.4	54.38	10	42.2	6	53.85	13	73.6	14	11.49	12	43.5	12	7.54	22	43.8	18
20.4	54.28	12	42.8	3	53.72	15	75.0	12	11.37	14	44.7	8	7.32	25	45.6	14
30.3	54.16	12	43.1	0	53.57	16	76.2	9	11.23	15	45.5	5	7.07	26	47.0	10
May 10.3	54.04	12	43.1	2	53.41	16	77.1	6	11.08	15	46.0	1	6.81	27	48.0	6
20.3	53.92	11	42.9	4	53.25	15	77.7	4	10.93	14	46.1	3	6.54	26	48.6	2
30.2	53.81	11	42.5	6	53.10	14	78.1	1	10.79	14	45.8	6	6.28	24	48.8	3
June 9.2	53.70	10	41.9	8	52.96	12	78.2	2	10.65	13	45.2	9	6.04	22	48.5	7
19.2	53.60	8	41.1	10	52.84	10	78.0	5	10.52	11	44.3	12	5.82	19	47.8	11
29.2	53.52	7	40.1	12	52.74	7	77.5	7	10.41	9	43.1	14	5.63	15	46.7	15
July 9.1	53.45	4	38.9	13	52.67	4	76.8	10	10.32	7	41.7	17	5.48	11	45.2	18
19.1	53.41	2	37.6	13	52.63	2	75.8	13	10.25	4	40.0	18	5.37	6	43.4	22
29.1	53.39	0	36.3	13	52.61	1	74.5	15	10.21	2	38.2	19	5.31	1	41.2	25
Aug. 8.1	53.39	3	35.0	13	52.62	4	73.0	17	10.19	1	36.3	19	5.30	3	38.7	27
18.0	53.42	6	33.7	12	52.66	8	71.3	19	10.20	5	34.4	19	5.33	8	36.0	28
28.0	53.48	9	32.5	10	52.74	12	69.4	20	10.25	9	32.5	18	5.41	14	33.2	29
Sept. 7.0	53.57	12	31.5	8	52.86	15	67.4	22	10.34	12	30.7	15	5.55	19	30.3	30
16.9	53.69	16	30.7	6	53.01	19	65.2	23	10.46	17	29.2	13	5.74	25	27.3	31
26.9	53.85	20	30.1	2	53.20	23	62.9	24	10.63	21	27.9	9	5.99	30	24.2	30
Oct. 6.9	54.05	23	29.9	2	53.43	27	60.5	25	10.84	25	27.0	4	6.29	35	21.2	30
16.9	54.28	27	30.1	6	53.70	31	58.0	24	11.09	28	26.6	0	6.64	41	18.2	28
26.8	54.55	29	30.7	10	54.01	34	55.6	23	11.37	32	26.6	5	7.05	45	15.4	25
Nov. 5.8	54.84	32	31.7	14	54.35	37	53.3	22	11.69	35	27.1	10	7.50	49	12.9	22
15.8	55.16	34	33.1	17	54.72	39	51.1	20	12.04	36	28.1	15	7.99	52	10.7	19
25.8	55.50	34	34.8	20	55.11	41	49.1	18	12.40	36	29.6	19	8.51	54	8.8	14
Dec. 5.7	55.84	34	36.8	23	55.52	40	47.3	15	12.76	36	31.5	23	9.05	53	7.4	10
15.7	56.18	33	39.1	25	55.92	39	45.8	11	13.12	35	33.8	26	9.58	52	6.4	5
25.7	56.51	30	41.6	26	56.31	37	44.7	7	13.47	32	36.4	29	10.10	49	5.9	1
35.6	56.81		44.2		56.68		44.0		13.79		39.3		10.59		6.0	
Sec δ, Tan δ	1.042		−0.294		1.255		+0.758		1.162		−0.592		1.808		+1.507	
Mean Place	$52^{\mathrm{s}}.934$		$30''.39$		$51^{\mathrm{s}}.461$		$71''.96$		$10^{\mathrm{s}}.145$		$29''.32$		$4^{\mathrm{s}}.129$		$37''.33$	
$D'_\psi \alpha$, $D_\omega \alpha$	0.00		−0.02		+0.01		+0.05		−0.01		−0.04		+0.02		+0.09	
$D_\psi \delta$, $D_\omega \delta$	−0.4		+0.4		−0.4		+0.4		−0.4		+0.4		−0.4		+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**9 H. Draconis.** Mag. 5.0				**ρ Leonis.** Mag. 3.8				**33 Sextantis.** Mag. 6.4				**41 Leonis Minoris.** Mag. 5.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination N		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 10 27		° ′ +76 9		h m 10 28		° ′ + 9 44		h m 10 36		° ′ − 1 16		h m 10 38		° ′ +23 38	
	s		″		s		″		s		″		s		″	
Jan. 0.7	49.02		28.8		14.63		76.4		59.20		58.8		42.17		34.2	
10.6	49.96	94	29.9	11	14.93	30	74.7	17	59.49	29	60.9	21	42.49	32	33.1	11
20.6	50.79	83	31.5	16	15.19	26	73.3	14	59.75	26	62.9	20	42.78	29	32.3	8
30.6	51.47	68	33.6	21	15.41	22	72.1	12	59.97	22	64.7	18	43.02	24	31.8	5
Feb. 9.6	51.99	52	36.1	25	15.58	17	71.2	9	60.15	18	66.3	16	43.22	20	31.7	1
19.5	52.32	33	38.8	27	15.71	13	70.6	6	60.28	13	67.6	13	43.37	15	31.9	2
Mar. 1.5	52.47	15	41.7	29	15.79	8	70.2	4	60.36	8	68.7	11	43.46	9	32.4	5
11.5	52.44	3	44.6	29	15.82	3	70.0	2	60.39	3	69.5	8	43.50	4	33.1	7
21.4	52.24	20	47.4	28	15.81	1	70.1	1	60.39	0	70.1	6	43.50	0	33.9	8
31.4	51.88	36	50.0	26	15.77	4	70.4	3	60.36	3	70.4	3	43.46	4	34.9	10
Apr. 10.4	51.39	49	52.3	23	15.70	7	70.8	4	60.30	6	70.5	1	43.39	7	35.9	10
20.4	50.79	60	54.2	19	15.61	9	71.2	4	60.21	9	70.5	0	43.29	10	36.9	10
30.3	50.11	68	55.7	15	15.50	11	71.7	5	60.11	10	70.3	2	43.18	11	37.9	10
May 10.3	49.38	73	56.7	10	15.39	11	72.3	6	60.01	10	70.0	3	43.06	12	38.8	9
20.3	48.63	75	57.1	4	15.28	11	72.9	6	59.90	11	69.6	4	42.94	12	39.5	7
30.3	47.89	74	56.9	2	15.18	10	73.4	5	59.80	10	69.1	5	42.82	12	40.1	6
June 9.2	47.18	71	56.2	7	15.08	10	73.9	5	59.70	10	68.6	5	42.71	11	40.5	4
19.2	46.53	65	55.0	12	14.99	9	74.4	5	59.61	9	68.0	6	42.61	10	40.7	2
29.2	45.95	58	53.3	17	14.92	7	74.8	4	59.54	7	67.3	7	42.53	8	40.8	1
July 9.1	45.46	49	51.2	21	14.87	5	75.1	3	59,48	6	66.6	7	42.46	7	40.6	2
19.1	45.07	39	48.6	26	14.84	3	75.4	3	59.44	4	65.9	7	42.41	5	40.2	4
29.1	44.80	27	45.7	29	14.83	1	75.5	1	59.42	2	65.3	6	42.39	2	39.7	5
Aug. 8.1	44.64	16	42.6	31	14.84	1	75.5	0	59.42	0	64.7	6	42.39	0	39.0	7
18.0	44.60	4	39.2	34	14.88	4	75.3	2	59.44	2	64.2	5	42.42	3	38.0	10
28.0	44.69	9	35.7	35	14.94	6	75.0	3	59.49	5	63.9	3	42.48	6	36.8	12
Sept. 7.0	44.91	22	32.1	36	15.03	9	74.5	5	59.57	8	63.8	1	42.57	9	35.5	13
17.0	45.27	36	28.5	36	15.16	13	73.8	7	59.68	11	63.9	1	42.69	12	34.0	15
26.9	45.75	48	25.0	35	15.32	16	72.9	9	59.83	15	64.2	3	42.84	15	32.3	17
Oct. 6.9	46.35	60	21.6	34	15.51	19	71.7	12	60.01	18	64.8	6	43.03	19	30.4	19
16.9	47.07	72	18.4	32	15.73	22	70.3	14	60.23	22	65.6	8	43.26	23	28.4	20
26.8	47.90	83	15.5	29	15.99	26	68.7	16	60.48	25	66.8	12	43.52	26	26.3	21
Nov. 5.8	48.83	93	13.0	25	16.28	29	67.0	17	60.76	28	68.3	15	43.82	30	24.1	22
15.8	49.83	100	10.9	21	16.60	32	65.1	19	61.06	30	70.0	17	44.15	33	21.9	22
25.8	50.89	106	9.3	16	16.93	33	63.0	21	61.39	33	71.9	19	44.50	35	19.7	22
Dec. 5.7	51.98	109	8.2	11	17.27	34	60.9	21	61.73	34	74.0	21	44.86	36	17.7	20
15.7	53.07	109	7.7	5	17.61	34	58.9	20	62.07	34	76.2	22	45.22	36	15.8	19
25.7	54.13	106	7.8	1	17.95	34	57.0	19	62 40	33	78.4	22	45.58	36	14.2	16
35.7	55.13	100	8.6	8	18.27	32	55.2	18	62.71	31	80.6	22	45.92	34	12.8	14
Sec δ, Tan δ	4.180		+4.059		1.015		+0.172		1.000		−0.022		1.092		+0.438	
Mean Place	44ˢ.011		41″.87		13ˢ.912		76″.80		58ˢ.629		61″.36		41ˢ.307		39″.08	
D′ψ α, Dω α	+0.04		+0.25		0.00		+0.01		0.00		0.00		0.00		+0.03	
Dψ δ, Dω δ	−0.4		+0.4		−0.4		+0.4		−0.4		+0.4		−0.4		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**θ Argûs.** Mag. 3.0				**42 Leonis Minoris.** Mag. 5.4				**η Argûs.** Var. 1.6–6.6				**μ Argûs.** Mag. 2.8			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 10 39		° ′ −63 56		h m 10 41		° ′ +31 7		h m 10 41		° ′ −59 13		h m 10 43		° ′ −48 57	
	s		″		s		″		s		″		s		″	
Jan. 0.7	51.33		1.4		2.83		80.1		41.27		18.9		1.76		21.9	
10.6	51.80	47	4.5	31	3.17	34	79.2	9	41.69	42	22.0	31	2.13	37	25.0	31
20.6	52.20	40	7.9	34	3.48	31	78.7	5	42.06	37	25.4	34	2.44	31	28.3	33
30.6	52.52	32	11.6	37	3.74	26	78.7	0	42.36	30	29.1	37	2.70	26	31.8	35
Feb. 9.6	52.75	23	15.5	39	3.95	21	79.0	3	42.58	22	32.9	38	2.90	20	35.4	36
19.5	52.89	14	19.4	39	4.10	15	79.6	6	42.72	14	36.7	38	3.03	13	39.0	36
Mar. 1.5	52.95	6	23.2	38	4.20	10	80.5	9	42.78	6	40.4	37	3.10	7	42.5	35
11.5	52.92	3	26.9	37	4.25	5	81.6	11	42.77	1	44.0	36	3.11	1	45.8	33
21.4	52.81	11	30.4	35	4.25	0	82.9	13	42.69	8	47.4	34	3.07	4	48.8	30
31.4	52.63	18	33.6	32	4.20	5	84.2	13	42.55	14	50.5	31	2.98	9	51.6	28
Apr. 10.4	52.39	24	36.5	29	4.12	8	85.6	14	42.36	19	53.2	27	2.85	13	54.0	24
20.4	52.10	29	39.0	25	4.02	10	86.9	13	42.13	23	55.6	24	2.69	16	56.0	20
30.3	51.78	32	41.0	20	3.90	12	88.0	11	41.86	27	57.5	19	2.51	18	57.6	16
May 10.3	51.42	36	42.6	16	3.76	14	89.0	10	41.57	29	59.0	15	2.30	21	58.8	12
20.3	51.04	38	43.7	11	3.62	14	89.8	8	41.26	31	60.0	10	2.08	22	59.5	7
30.3	50.66	38	44.3	6	3.49	13	90.4	6	40.94	32	60.5	5	1.86	22	59.8	3
June 9.2	50.28	38	44.3	0	3.37	12	90.7	3	40.63	31	60.4	1	1.65	21	59.6	2
19.2	49.90	38	43.8	5	3.26	11	90.8	1	40.33	30	59.9	5	1.44	21	59.0	6
29.2	49.54	36	42.8	10	3.16	10	90.6	2	40.04	29	58.9	10	1.24	20	57.9	11
July 9.1	49.21	33	41.4	14	3.08	8	90.2	4	39.78	26	57.5	14	1.06	18	56.5	14
19.1	48.93	28	39.5	19	3.03	5	89.5	7	39.55	23	55.6	19	0.91	15	54.7	18
29.1	48.70	23	37.3	22	3.00	3	88.6	9	39.36	19	53.4	22	0.79	12	52.6	21
Aug. 8.1	48.52	18	34.8	25	3.00	0	87.5	11	39.22	14	50.9	25	0.71	8	50.3	23
18.0	48.41	11	32.1	27	3.02	2	86.1	14	39.14	8	48.2	27	0.67	4	47.8	25
28.0	48.37	4	29.2	29	3.07	5	84.5	16	39.12	2	45.5	27	0.67	0	45.3	25
Sept. 7.0	48.42	5	26.3	29	3.16	9	82.7	18	39.17	5	42.7	28	0.72	5	42.8	25
17.0	48.55	13	23.5	28	3.28	12	80.8	19	39.29	12	40.0	27	0.83	11	40.5	23
26.9	48.77	22	20.9	26	3.44	16	78.7	21	39.49	20	37.6	24	1.00	17	38.4	21
Oct. 6.9	49.08	31	18.7	22	3.64	20	76.5	22	39.76	27	35.5	21	1.23	23	36.6	18
16.9	49.47	39	16.9	18	3.88	24	74.2	23	40.10	34	33.8	17	1.51	28	35.3	13
26.8	49.93	46	15.6	13	4.16	28	71.8	24	40.50	40	32.6	12	1.84	33	34.5	8
Nov. 5.8	50.45	52	14.9	7	4.47	31	69.4	24	40.96	46	32.0	6	2.21	37	34.2	3
15.8	51.02	57	14.8	1	4.81	34	67.1	23	41.46	50	32.0	0	2.62	41	34.5	3
25.8	51.62	60	15.3	5	5.17	36	64.9	22	41.99	53	32.6	6	3.06	44	35.4	9
Dec. 5.7	52.22	60	16.5	12	5.55	38	62.9	20	42.53	54	33.9	13	3.51	45	36.8	14
15.7	52.81	59	18.3	18	5.93	38	61.1	18	43.06	53	35.8	19	3.95	44	38.8	20
25.7	53.38	57	20.6	23	6.31	38	59.7	14	43.56	50	38.2	24	4.37	42	41.3	25
35.7	53.90	52	23.5	29	6.67	36	58.6	11	44.02	46	41.1	29	4.77	40	44.2	29
Sec δ, Tan δ	2.276		−2.045		1.168		+0.604		1.955		−1.679		1.523		−1.149	
Mean Place	50ˢ.959		20″.26		1ˢ.843		86″.98		40ˢ.951		36″.99		1ˢ.464		37″.90	
D′ψ α, Dω α	−0.02		−0.13		+0.01		+0.04		−0.01		−0.11		−0.01		−0.07	
Dψ δ, Dω δ	−0.4		+0.3		−0.4		+0.3		−0.4		+0.3		−0.4		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*l* Leonis. Mag. 5.3				δ^2 Chamæleon. Mag. 4.6				ν Hydræ. Mag. 3.3				46 Leonis Minoris. Mag. 3.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 10 44		° ′ +10 59		h m 10 44		° ′ −80 4		h m 10 45		° ′ −15 44		h m 10 48		° ′ +34 40	
	s		″		s		″		s		″		s		″	
Jan. 0.7	41.81	31	79.2	17	59.29	103	31.8	29	20.27	30	9.7	25	28.04	36	54.9	8
10.6	42.12	28	77.5	14	60.32	87	34.7	33	20.57	27	12.2	26	28.40	32	54.1	3
20.6	42.40	23	76.1	11	61.19	68	38.0	36	20.84	23	14.8	25	28.72	28	53.8	1
30.6	42.63	19	75.0	9	61.87	47	41.6	38	21.07	18	17.3	23	29.00	22	53.9	4
Feb. 9.6	42.82	14	74.1	6	62.34	25	45.4	39	21.25	13	19.6	21	29.22	17	54.3	8
19.5	42.96	10	73.5	3	62.59	4	49.3	40	21.38	8	21.7	19	29.39	11	55.1	11
Mar. 1.5	43.06	5	73.2	1	62.63	16	53.3	39	21.46	4	23.6	17	29.50	6	56.2	13
11.5	43.11	1	73.1	1	62.47	35	57.2	38	21.50	0	25.3	14	29.56	0	57.5	15
21.5	43.12	3	73.2	3	62.12	53	61.0	36	21.50	3	26.7	12	29.56	4	59.0	15
31.4	43.09	6	73.5	5	61.59	69	64.6	33	21.47	6	27.9	9	29.52	8	60.5	15
Apr. 10.4	43.03	8	74.0	6	60.90	83	67.9	29	21.41	8	28.8	6	29.44	10	62.0	14
20.4	42.95	10	74.6	6	60.07	95	70.8	25	21.33	10	29.4	4	29.34	13	63.4	13
30.3	42.85	10	75.2	6	59.12	104	73.3	21	21.23	11	29.8	1	29.21	14	64.7	11
May 10.3	42.75	11	75.8	6	58.08	110	75.4	15	21.12	11	29.9	1	29.07	15	65.8	9
20.3	42.64	10	76.4	6	56.98	115	76.9	10	21.01	11	29.8	3	28.92	14	66.7	6
30.3	42.54	10	77.0	5	55.83	116	77.9	4	20.90	11	29.5	5	28.78	13	67.3	3
June 9.2	42.44	9	77.5	5	54.67	115	78.3	1	20.79	10	29.0	7	28.65	12	67.6	0
19.2	42.35	8	78.0	4	53.52	111	78.2	6	20.69	9	28.3	9	28.53	11	67.6	2
29.2	42.27	6	78.4	3	52.41	103	77.6	12	20.60	7	27.4	11	28.42	9	67.4	5
July 9.2	42.21	4	78.7	2	51.38	92	76.4	17	20.53	6	26.3	11	28.33	7	66.9	8
19.1	42.17	3	78.9	0	50.46	79	74.7	21	20.47	4	25.2	12	28.26	4	66.1	11
29.1	42.14	0	78.9	1	49.67	63	72.6	25	20.43	2	24.0	13	28.22	1	65.0	13
Aug. 8.1	42.14	2	78.8	3	49.04	45	70.1	27	20.41	1	22.7	12	28.21	1	63.7	16
18.0	42.16	5	78.5	4	48.59	25	67.4	29	20.42	4	21.5	11	28.22	4	62.1	18
28.0	42.21	8	78.1	6	48.34	3	64.5	30	20.46	7	20.4	10	28.26	8	60.3	20
Sept. 7.0	42.29	11	77.5	8	48.31	20	61.5	30	20.53	10	19.4	8	28.34	12	58.3	21
17.0	42.40	14	76.7	10	48.51	43	58.5	29	20.63	14	18.6	5	28.46	16	56.2	23
26.9	42.54	17	75.7	12	48.94	65	55.6	26	20.77	18	18.1	2	28.62	20	53.9	24
Oct. 6.9	42.71	21	74.5	15	49.59	86	53.0	22	20.95	21	17.9	2	28.82	24	51.5	25
16.9	42.92	25	73.0	17	50.45	103	50.8	18	21.16	25	18.1	5	29.06	27	49.0	25
26.9	43.17	28	71.3	18	51.48	118	49.0	12	21.41	28	18.6	9	29.33	31	46.5	25
Nov. 5.8	43.45	31	69.5	20	52.66	129	47.8	6	21.69	31	19.5	13	29.64	35	44.0	24
15.8	43.76	33	67.5	21	53.95	135	47.2	1	22.00	33	20.8	17	29.99	37	41.6	23
25.8	44.09	34	65.4	21	55.30	137	47.3	8	22.33	34	22.5	20	30.36	39	39.3	21
Dec. 5.7	44.43	35	63.3	21	56.67	134	48.1	14	22.67	35	24.5	22	30.75	40	37.2	17
15.7	44.78	34	61.2	20	58.01	126	49.5	20	23.02	34	26.7	24	31.15	39	35.5	14
25.7	45.12	32	59.2	18	59.27	113	51.5	25	23.36	32	29.1	25	31.54	37	34.1	10
35.7	45.44		57.4		60.40		54.0		23.68		31.6		31.91		33.1	
Sec δ, Tan δ	1.019		+0.194		5.806		−5.719		1.039		−0.282		1.216		+0.692	
Mean Place	$41^{\mathrm{s}}.160$		$80''.70$		$58^{\mathrm{s}}.640$		$52''.70$		$19^{\mathrm{s}}.858$		$16''.54$		$27^{\mathrm{s}}.019$		$63''.16$	
$D'_{\psi}\,a$, $D_{\omega}\,a$	0.00		+0.01		−0.05		−0.36		0.00		−0.02		+0.01		+0.04	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.4		+0.3		−0.4		+0.3		−0.4		+0.3		−0.4		+0.3	

Mean Solar Date.	**54 Leonis.** Mag. 4.5				**ι Antliæ.** Mag. 4.7				**Groombridge 1706.** Mag. 6.3				**α Crateris.** Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 10 50		° ′ +25 12		h m 10 52		° ′ −36 39		h m 10 53		° ′ +78 13		h m 10 55		° ′ −17 50	
	s		″		s		″		s		″		s		″	
Jan. 0.7	55.13	33	44.7	12	40.18	33	58.7	30	7.09	114	56.4	8	32.39	31	0.4	26
10.6	55.46	30	43.5	8	40.51	29	61.7	31	8.23	102	57.2	14	32.70	28	3.0	26
20.6	55.76	26	42.7	4	40.80	25	64.8	32	9.25	86	58.6	19	32.98	24	5.6	25
30.6	56.02	21	42.3	1	41.05	20	68.0	32	10.11	69	60.5	23	33.22	19	8.1	24
Feb. 9.6	56.23	16	42.2	2	41.25	14	71.2	31	10.80	49	62.8	27	33.41	14	10.5	23
19.5	56.39	11	42.4	5	41.39	9	74.3	30	11.29	28	65.5	29	33.55	9	12.8	21
Mar. 1.5	56.50	5	42.9	8	41.48	4	77.3	28	11.57	6	68.4	30	33.64	5	14.9	18
11.5	56.55	1	43.7	10	41.52	1	80.1	25	11.63	15	71.4	29	33.69	1	16.7	16
21.5	56.56	3	44.7	11	41.51	5	82.6	23	11.48	33	74.3	28	33.70	3	18.3	13
31.4	56.53	6	45.8	11	41.46	8	84.9	20	11.15	50	77.1	25	33.67	5	19.6	10
Apr. 10.4	56.47	9	46.9	11	41.38	11	86.9	16	10.65	65	79.6	22	33.62	8	20.6	7
20.4	56.38	11	48.0	11	41.27	13	88.5	12	10.00	76	81.8	17	33.54	10	21.3	5
30.3	56.27	12	49.1	10	41.14	14	89.7	9	9.24	84	83.5	12	33.44	10	21.8	3
May 10.3	56.15	12	50.1	8	41.00	15	90.6	5	8.40	88	84.7	7	33.34	11	22.1	0
20.3	56.03	12	50.9	6	40.85	15	91.1	1	7.52	89	85.4	2	33.23	11	22.1	3
30.3	55.91	11	51.5	4	40.70	15	91.2	3	6.63	88	85.6	4	33.12	11	21.8	5
June 9.2	55.80	10	51.9	3	40.55	15	90.9	6	5.75	84	85.2	10	33.01	11	21.3	7
19.2	55.70	9	52.2	1	40.40	14	90.3	10	4.91	77	84.2	15	32.90	10	20.6	9
29.2	55.61	8	52.3	2	40.26	13	89.3	13	4.14	68	82.7	19	32.80	8	19.7	10
July 9.2	55.53	6	52.1	4	40.13	11	88.0	16	3.46	57	80.8	24	32.72	6	18.7	11
19.1	55.47	3	51.7	6	40.02	8	86.4	18	2.89	45	78.4	28	32.66	5	17.6	12
29.1	55.44	1	51.1	8	39.94	5	84.6	20	2.44	33	75.6	31	32.61	3	16.4	13
Aug. 8.1	55.43	2	50.3	10	39.89	2	82.6	20	2.11	19	72.5	33	32.58	0	15.1	13
18.0	55.45	4	49.3	13	39.87	1	80.6	20	1.92	4	69.2	36	32.58	2	13.8	12
28.0	55.49	7	48.0	15	39.88	5	78.6	20	1.88	11	65.6	37	32.60	5	12.6	11
Sept. 7.0	55.56	11	46.5	16	39.93	9	76.6	19	1.99	26	61.9	37	32.65	9	11.5	9
17.0	55.67	14	44.9	18	40.02	14	74.7	16	2.25	42	58.2	37	32.74	13	10.6	6
26.9	55.81	18	43.1	20	40.16	19	73.1	13	2.67	57	54.5	36	32.87	17	10.0	3
Oct. 6.9	55.99	22	41.1	21	40.35	23	71.8	9	3.24	72	50.9	34	33.04	21	9.7	0
16.9	56.21	26	39.0	22	40.58	28	70.9	4	3.96	85	47.5	32	33.25	24	9.7	4
26.9	56.47	29	36.8	23	40.86	32	70.5	1	4.81	98	44.3	28	33.49	28	10.1	8
Nov. 5.8	56.76	32	34.5	23	41.18	35	70.6	6	5.79	109	41.5	24	33.77	31	10.9	12
15.8	57.08	35	32.2	23	41.53	38	71.2	11	6.88	117	39.1	19	34.08	33	12.1	16
25.8	57.43	36	29.9	21	41.91	39	72.3	16	8.05	123	37.2	14	34.41	34	13.7	19
Dec. 5.7	57.79	37	27.8	19	42.30	39	73.9	21	9.28	125	35.8	8	34.75	35	15.6	22
15.7	58.16	36	25.9	17	42.69	38	76.0	25	10.53	123	35.0	2	35.10	34	17.8	24
25.7	58.52	35	24.2	14	43.07	35	78.5	28	11.76	118	34.8	4	35.44	33	20.2	25
35.7	58.87		22.8		43.42		81.3		12.94		35.2		35.77		22.7	
Sec δ, Tan δ	1.105		+0.471		1.247		−0.745		4.904		+4.801		1.051		−0.322	
Mean Place	$54^{\mathrm{s}}.306$		$50''.57$		$39^{\mathrm{s}}.923$		$71''.58$		$1^{\mathrm{s}}.693$		$71''.48$		$32^{\mathrm{s}}.054$		$7''.65$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	0.00		+0.03		−0.01		−0.05		+0.04		+0.31		0.00		−0.02	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.4		+0.3		−0.4		+0.3		−0.4		+0.3		−0.4		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*d* Leonis. Mag. 5.0 Right Ascension.		*d* Leonis. Mag. 5.0 Declination N.		*β* Ursæ Majoris. Mag. 2.4 Right Ascension.		*β* Ursæ Majoris. Mag. 2.4 Declination N.		*α* Ursæ Majoris. Mag. 2.0 Right Ascension.		*α* Ursæ Majoris. Mag. 2.0 Declination N.		*χ* Leonis. Mag 4.7 Right Ascension.		*χ* Leonis. Mag 4.7 Declination N.	
	h m 10 56		° ′ + 4 4		h m 10 56		° ′ +56 50		h m 10 58		° ′ +62 12		h m 11 0		° ′ + 7 48	
	s		″		s		″		s		″		s		″	
Jan. 0.7	4.60		65.5		37.81		43.1		24.36		61.2		32.36		22.9	
10.7	4.91	31	63.5	20	38.31	50	43.2	1	24.92	56	61.4	2	32.67	31	21.0	19
20.6	5.19	28	61.7	18	38.76	45	43.8	6	25.43	51	62.1	7	32.95	28	19.4	16
30.6	5.43	24	60.2	15	39.15	39	44.9	11	25.87	44	63.4	13	33.19	24	18.0	14
Feb. 9.6	5.62	19	58.9	13	39.46	31	46.4	15	26.23	36	65.2	18	33.39	20	16.9	11
19.5	5.77	15	57.9	10	39.69	23	48.3	19	26.50	27	67.3	21	33.55	16	16.1	8
Mar. 1.5	5.87	10	57.1	8	39.84	15	50.5	22	26.67	17	69.7	24	33.66	11	15.6	5
11.5	5.93	6	56.6	5	39.91	7	52.9	24	26.74	7	72.3	26	33.72	6	15.3	3
21.5	5.95	2	56.3	3	39.90	1	55.3	24	26.72	2	74.9	26	33.74	2	15.2	1
31.4	5.93	2	56.3	0	39.83	7	57.7	24	26.62	10	77.4	25	33.73	1	15.4	2
Apr. 10.4	5.88	5	56.4	1	39.69	14	60.0	23	26.45	17	79.8	24	33.69	4	15.7	3
20.4	5.81	7	56.6	2	39.50	19	62.0	20	26.22	23	81.9	21	33.62	7	16.1	4
30.4	5.73	8	57.0	4	39.27	23	63.7	17	25.94	28	83.7	18	33.53	9	16.6	5
May 10.3	5.64	9	57.5	5	39.02	25	65.0	13	25.63	31	85.1	14	33.44	9	17.2	6
20.3	5.54	10	58.0	5	38.76	26	66.0	10	25.30	33	86.0	9	33.34	10	17.8	6
30.3	5.44	10	58.5	5	38.49	27	66.5	5	24.97	33	86.4	4	33.24	10	18.4	6
June 9.2	5.34	10	59.1	6	38.23	26	66.5	0	24.65	32	86.4	0	33.14	10	19.0	6
19.2	5.25	9	59.7	6	37.99	24	66.1	4	24.34	31	85.9	5	33.05	9	19.5	5
29.2	5.17	8	60.2	5	37.77	22	65.3	8	24.06	28	84.9	10	32.97	8	20.0	5
July 9.2	5.10	7	60.7	5	37.58	19	64.0	13	23.82	24	83.5	14	32.90	7	20.4	4
19.1	5.05	5	61.1	4	37.42	16	62.4	16	23.62	20	81.7	18	32.85	5	20.7	3
29.1	5.02	3	61.5	4	37.31	11	60.4	20	23.46	16	79.5	22	32.81	4	20.9	2
Aug. 8.1	5.01	1	61.8	3	37.24	7	58.0	24	23.35	11	76.9	26	32.79	2	21.0	1
18.1	5.02	1	62.0	2	37.21	3	55.4	26	23.30	5	74.1	28	32.79	0	20.9	1
28.0	5.05	3	62.0	0	37.23	2	52.6	28	23.31	1	71.0	31	32.82	3	20.7	2
Sept. 7.0	5.11	6	61.8	2	37.31	8	49.6	30	23.38	7	67.8	32	32.88	6	20.3	4
17.0	5.21	10	61.4	4	37.44	13	46.4	32	23.52	14	64.5	33	32.97	9	19.7	6
26.9	5.34	13	60.7	7	37.63	19	43.2	32	23.73	21	61.1	34	33.09	12	18.8	9
Oct. 6.9	5.50	16	59.8	9	37.88	25	40.0	32	24.01	28	57.7	34	33.25	16	17.7	11
16.9	5.70	20	58.7	11	38.18	30	36.8	32	24.35	34	54.4	33	33.45	20	16.4	13
26.9	5.94	24	57.3	14	38.54	36	33.7	31	24.75	40	51.3	31	33.68	23	14.8	16
Nov. 5.8	6.21	27	55.6	17	38.96	42	30.9	28	25.22	47	48.4	29	33.95	27	13.0	18
15.8	6.51	30	53.8	18	39.42	46	28.3	26	25.75	53	45.8	26	34.25	30	11.1	19
25.8	6.83	32	51.8	20	39.92	50	26.1	22	26.32	57	43.5	23	34.57	32	9.0	21
Dec. 5.7	7.17	34	49.7	21	40.45	53	24.2	19	26.91	59	41.7	18	34.91	34	6.8	22
15.7	7.51	34	47.5	22	40.99	54	22.8	14	27.52	61	40.4	13	35.25	34	4.6	22
25.7	7.85	34	45.3	22	41.52	53	22.0	8	28.13	61	39.7	7	35.59	34	2.5	21
35.7	8.17	32	43.3	20	42.04	52	21.7	3	28.71	58	39.6	1	35.92	33	0.6	19
Sec δ, Tan δ	1.003		+0.071		1.828		+1.531		2.145		+1.898		1.009		+0.137	
Mean Place	4ˢ.084		65″.27		36ˢ.032		56″.40		22ˢ.218		75″.30		31ˢ.821		24″ 05	
D′ψ α, Dω α	0.00		0.00		+0.01		+0.10		+0.01		+0.12		0.00		+0.01	
Dψ δ, Dω δ	−0.4		+0.3		−0.4		+0.3		−0.4		+0.3		−0.4		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	p^4 Leonis. Mag. 5 7				ψ Ursæ Majoris. Mag. 3.2				β Crateris. Mag. 4.5				δ Leonis. Mag. 2.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	11 2		+ 2 25		11 4		+44 57		11 7		−22 20		11 9		+20 59	
	s		″		s		″		s		″		s		″	
Jan. 0.7	28.47		41.8		47.89		63.2		22.87		54.5		29.70		56.2	
10.7	28.78	31	39.8	20	48.30	41	62.7	5	23.19	32	57.1	26	30.03	33	54.8	14
20.6	29.06	28	37.9	19	48.67	37	62.7	0	23.48	29	59.8	27	30.33	30	53.7	11
30.6	29.30	24	36.2	17	49.00	33	63.2	5	23.73	25	62.5	27	30.60	27	52.9	8
Feb. 9.6	29.50	20	34.8	14	49.27	27	64.1	9	23.93	20	65.2	27	30.83	23	52.5	4
19.5	29.66	16	33.7	11	49.48	21	65.4	13	24.09	16	67.7	25	31.00	17	52.4	1
Mar. 1.5	29.77	11	32.8	9	49.62	14	67.0	16	24.20	11	70.0	23	31.12	12	52.7	3
11.5	29.83	6	32.2	6	49.70	8	68.9	19	24.26	6	72.1	21	31.20	8	53.2	5
21.5	29.85	2	31.8	4	49.72	2	70.9	20	24.28	2	73.9	18	31.23	3	53.9	7
31.4	29.84	1	31.7	1	49.68	4	72.9	20	24.26	2	75.5	16	31.22	1	54.8	9
Apr. 10.4	29.80	4	31.7	0	49.59	9	74.8	19	24.22	4	76.8	13	31.18	4	55.8	10
20.4	29.73	7	31.9	2	49.47	12	76.6	18	24.15	7	77.8	10	31.11	7	56.8	10
30.4	29.65	8	32.2	3	49.32	15	78.2	16	24.06	9	78.5	7	31.02	9	57.8	10
May 10.3	29.56	9	32.6	4	49.15	17	79.6	14	23.96	10	79.0	5	30.92	10	58.8	10
20.3	29.46	10	33.1	5	48.97	18	80.6	10	23.85	11	79.2	2	30.81	11	59.7	9
30.3	29.36	10	33.6	5	48.79	18	81.3	7	23.73	12	79.1	1	30.70	11	60.4	7
June 9.2	29.26	10	34.2	6	48.61	18	81.6	3	23.61	12	78.7	4	30.59	11	61.0	6
19.2	29.17	9	34.8	6	48.45	16	81.6	0	23.50	11	78.1	6	30.49	10	61.4	4
29.2	29.09	8	35.4	6	48.30	15	81.2	4	23.40	10	77.2	9	30.40	9	61.6	2
July 9.2	29.02	7	35.9	5	48.17	13	80.4	8	23.31	9	76.2	10	30.32	8	61.6	0
19.1	28.96	6	36.4	5	48.06	11	79.3	11	23.23	8	75.0	12	30.25	7	61.4	2
29.1	28.92	4	36.8	4	47.98	8	77.8	15	23.17	6	73.7	13	30.20	5	61.0	4
Aug. 8.1	28.90	2	37.1	3	47.93	5	76.0	18	23.13	4	72.3	14	30.18	2	60.4	6
18.1	28.90	0	37.4	3	47.91	2	74.0	20	23.11	2	70.9	14	30.18	0	59.6	8
28.0	28.93	3	37.5	1	47.93	2	71.7	23	23.12	1	69.5	14	30.20	2	58.6	10
Sept. 7.0	28.99	6	37.4	1	47.99	6	69.2	25	23.16	4	68.2	13	30.25	5	57.4	12
17.0	29.08	9	37.1	3	48.09	10	66.5	27	23.24	8	67.1	11	30.34	9	56.0	14
26.9	29.20	12	36.5	6	48.24	15	63.7	28	23.36	12	66.2	9	30.46	12	54.4	16
Oct. 6.9	29.36	16	35.7	8	48.44	20	60.8	29	23.52	16	65.6	6	30.62	16	52.6	18
16.9	29.55	19	34.6	11	48.68	24	57.9	29	23.72	20	65.4	2	30.82	20	50.6	20
26.9	29.78	23	33.3	13	48.97	29	55.0	29	23.96	24	65.5	1	31.05	23	48.4	22
Nov. 5.8	30.04	26	31.7	16	49.30	33	52.2	28	24.24	28	66.0	5	31.32	27	46.1	23
15.8	30.34	30	29.9	18	49.67	37	49.6	26	24.55	31	67.0	10	31.63	31	43.8	23
25.8	30.66	32	27.9	20	50.07	40	47.2	24	24.88	33	68.4	14	31.96	33	41.5	23
Dec. 5.8	30.99	33	25.8	21	50.50	43	45.1	21	25.23	35	70.2	18	32.31	35	39.3	22
15.7	31.33	34	23.6	22	50.94	44	43.4	17	25.59	36	72.3	21	32.67	36	37.2	21
25.7	31.67	34	21.4	22	51.38	44	42.1	13	25.94	35	74.7	24	33.02	35	35.3	19
35.7	32.00	33	19.3	21	51.81	43	41.3	8	26.28	34	77.3	26	33.37	35	33.7	16
Sec δ, Tan δ	1.001		+0.042		1.413		+0.999		1.081		−0.411		1.071		+0.384	
Mean Place	$28^{\mathrm{s}}.001$		$41''.26$		$46^{\mathrm{s}}.697$		$74''.81$		$22^{\mathrm{s}}.634$		$62''.89$		$29^{\mathrm{s}}.043$		$61''.82$	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	0.00		0.00		+0.01		+0.06		0.00		−0.03		0.00		+0.02	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.4		+0.2		−0.4		+0.2		−0.4		+0.2		−0.4		+0.2	

[Eph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**θ Leonis.** Mag. 3.4				**ν Ursæ Majoris.** Mag. 3.7				**δ Crateris.** Mag. 3.8				**σ Leonis.** Mag. 4.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	11 9		+15 53		11 13		+33 33		11 14		−14 18		11 16		+ 6 29	
	s		″		s		″		s		″		s		″	
Jan. 0.7	41.14		74.9		47.85		59.8		59.64		21.7		39.52		81.6	
10.7	41.47	33	73.2	17	48.22	37	58.8	10	59.96	32	24.1	24	39.84	32	79.6	20
20.6	41.76	29	71.9	13	48.55	33	58.2	6	60.24	28	26.6	25	40.13	29	77.9	17
30.6	42.02	26	70.9	10	48.84	29	58.1	1	60.49	25	29.0	24	40.38	25	76.4	15
Feb. 9.6	42.24	22	70.2	7	49.09	25	58.4	3	60.70	21	31.2	22	40.60	22	75.2	12
19.6	42.41	17	69.9	3	49.29	20	59.0	6	60.87	17	33.3	21	40.77	17	74.3	9
Mar. 1.5	42.53	12	69.8	1	49.43	14	60.0	10	60.99	12	35.2	19	40.89	12	73.6	7
11.5	42.60	7	70.0	2	49.51	8	61.3	13	61.06	7	36.8	16	40.97	8	73.2	4
21.5	42.63	3	70.4	4	49.54	3	62.7	14	61.09	3	38.2	14	41.01	4	73.1	1
31.4	42.63	0	71.0	6	49.53	1	64.2	15	61.09	0	39.3	11	41.01	0	73.2	1
Apr. 10.4	42.59	4	71.8	8	49.48	5	65.8	16	61.06	3	40.2	9	40.98	3	73.4	2
20.4	42.52	7	72.6	8	49.40	8	67.3	15	61.00	6	40.8	6	40.92	6	73.8	4
30.4	42.44	8	73.5	9	49.29	11	68.7	14	60.92	8	41.2	4	40.85	7	74.3	5
May 10.3	42.35	9	74.3	8	49.17	12	70.0	13	60.83	9	41.4	2	40.77	8	74.9	6
20.3	42.25	10	75.0	7	49.04	13	71.1	11	60.73	10	41.4	0	40.68	9	75.5	6
30.3	42.14	11	75.7	7	48.90	14	71.9	8	60.63	10	41.2	2	40.58	10	76.1	6
June 9.3	42.04	10	76.3	6	48.76	14	72.4	5	60.52	11	40.7	5	40.48	10	76.7	6
19.2	41.94	10	76.8	5	48.63	13	72.6	2	60.42	10	40.1	6	40.39	9	77.2	5
29.2	41.85	9	77.1	3	48.52	11	72.5	1	60.33	9	39.3	8	40.30	9	77.7	5
July 9.2	41.78	7	77.3	2	48.42	10	72.2	3	60.25	8	38.4	9	40.23	7	78.2	5
19.1	41.72	6	77.3	0	48.33	9	71.6	6	60.18	7	37.4	10	40.17	6	78.6	4
29.1	41.67	5	77.1	2	48.26	7	70.7	9	60.12	6	36.4	10	40.12	5	78.8	2
Aug. 8.1	41.64	3	76.8	3	48.22	4	69.5	12	60.08	4	35.4	10	40.09	3	78.9	1
18.1	41.64	0	76.3	5	48.21	1	68.0	15	60.06	2	34.3	11	40.08	1	78.9	0
28.0	41.67	3	75.6	7	48.23	2	66.3	17	60.07	1	33.3	10	40.10	2	78.7	2
Sept. 7.0	41.72	5	74.7	9	48.28	5	64.4	19	60.11	4	32.5	8	40.14	4	78.4	3
17.0	41.80	8	73.6	11	48.36	8	62.3	21	60.18	7	31.8	7	40.21	7	77.8	6
27.0	41.92	12	72.2	14	48.48	12	60.0	23	60.29	11	31.3	5	40.32	11	77.0	8
Oct. 6.9	42.07	15	70.6	16	48.64	16	57.5	25	60.44	15	31.1	2	40.47	15	76.0	10
16.9	42.26	19	68.9	17	48.85	21	54.9	26	60.62	18	31.3	2	40.65	18	74.7	13
26.9	42.49	23	67.0	19	49.10	25	52.3	26	60.85	23	31.8	5	40.87	22	73.2	15
Nov. 5.8	42.76	27	64.9	21	49.39	29	49.7	26	61.12	27	32.7	9	41.12	25	71.5	17
15.8	43.06	30	62.7	22	49.71	32	47.1	26	61.42	30	33.9	12	41.41	29	69.6	19
25.8	43.39	33	60.5	22	50.06	35	44.7	24	61.74	32	35.5	16	41.73	32	67.5	21
Dec. 5.8	43.73	34	58.3	22	50.44	38	42.5	22	62.08	34	37.4	19	42.06	33	65.3	22
15.7	44.08	35	56.1	22	50.83	39	40.5	20	62.43	35	39.5	21	42.40	34	63.1	22
25.7	44.43	35	54.1	20	51.22	39	38.9	16	62.77	34	41.8	23	42.74	34	61.0	21
35.7	44.77	34	52.3	18	51.60	38	37.6	13	63.10	33	44.3	25	43.08	34	58.9	21
Sec δ, Tan δ	1.040		+0.285		1.200		+0.664		1.032		−0.255		1.006		+0.114	
Mean Place	$40^{s}.558$		$78''.92$		$47^{s}.005$		$69''.20$		$59^{s}.386$		$27''.32$		$39^{s}.080$		$82''.90$	
$D'_\psi \alpha$, $D_\omega \alpha$	0.00		+0.02		0.00		+0.04		0.00		−0.02		0.00		+0.01	
$D_\psi \delta$, $D_\omega \delta$	−0.4		+0.2		−0.4		+0.2		−0.4		+0.2		−0.4		+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**π Centauri.** Mag. 4.3				**ι Leonis.** Mag. 4.0				**τ Leonis.** Mag. 5.2				**λ Draconis.** Mag. 4.1			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	11 17		−54 0		11 19		+11 0		11 23		+ 3 19		11 26		+69 48	
	s		″		s		″		s		″		s		″	
Jan. 0.7	2.04	43	34.0	28	23.84	33	28.0	18	28.18	32	67.4	21	17.87	74	24.2	1
10.7	2.47	38	36.8	31	24.17	30	26.2	16	28.50	29	65.3	19	18.61	69	24.3	7
20.6	2.85	33	39.9	34	24.47	26	24.6	13	28.79	26	63.4	16	19.30	61	25.0	13
30.6	3.18	27	43.3	36	24.73	22	23.3	10	29.05	22	61.8	14	19.91	51	26.3	18
Feb. 9.6	3.45	20	46.9	36	24.95	17	22.3	6	29.27	17	60.4	11	20.42	40	28.1	22
19.6	3.65	13	50.5	36	25.12	13	21.7	4	29.44	13	59.3	9	20.82	28	30.3	26
Mar. 1.5	3.78	7	54.1	35	25.25	9	21.3	1	29.57	9	58.4	6	21.10	15	32.9	28
11.5	3.85	1	57.6	33	25.34	4	21.2	1	29.66	5	57.8	3	21.25	3	35.7	28
21.5	3.86	5	60.9	31	25.38	0	21.3	4	29.71	1	57.5	1	21.28	9	38.5	28
31.4	3.81	10	64.0	28	25.38	3	21.7	5	29.72	2	57.4	1	21.19	20	41.3	27
Apr. 10.4	3.71	14	66.8	24	25.35	5	22.2	6	29.70	5	57.5	2	20.99	29	44.0	24
20.4	3.57	17	69.2	21	25.30	7	22.8	7	29.65	7	57.7	4	20.70	36	46.4	20
30.4	3.40	20	71.3	17	25.23	9	23.5	7	29.58	8	58.1	5	20.34	42	48.4	17
May 10.3	3.20	22	73.0	12	25.14	9	24.2	7	29.50	9	58.6	5	19.92	46	50.1	12
20.3	2.98	24	74.2	7	25.05	10	24.9	7	29.41	9	59.1	6	19.46	48	51.3	7
30.3	2.74	25	74.9	3	24.95	10	25.6	6	29.32	10	59.7	6	18.98	48	52.0	2
June 9.3	2.49	24	75.2	2	24.85	9	26.2	5	29.22	9	60.3	6	18.50	47	52.2	4
19.2	2.25	24	75.0	6	24.76	8	26.7	4	29.13	9	60.9	5	18.03	45	51.8	9
29.2	2.01	23	74.4	11	24.68	8	27.1	3	29.04	8	61.4	5	17.58	42	50.9	13
July 9.2	1.78	21	73.3	15	24.60	7	27.4	2	28.96	7	61.9	5	17.16	37	49.6	18
19.1	1.57	18	71.8	18	24.53	5	27.6	1	28.89	5	62.4	4	16.79	31	47.8	23
29.1	1.39	15	70.0	21	24.48	3	27.7	1	28.84	3	62.8	3	16.48	25	45.5	27
Aug. 8.1	1.24	11	67.9	24	24.45	1	27.6	2	28.81	1	63.1	1	16.23	17	42.8	29
18.1	1.13	5	65.5	25	24.44	1	27.4	4	28.80	1	63.2	0	16.06	9	39.9	32
28.0	1.08	0	63.0	26	24.45	4	27.0	6	28.81	3	63.2	2	15.97	1	36.7	34
Sept. 7.0	1.08	6	60.4	25	24.49	7	26.4	9	28.84	6	63.0	4	15.96	7	33.3	36
17.0	1.14	13	57.9	24	24.56	11	25.5	11	28.90	10	62.6	6	16.03	16	29.7	37
27.0	1.27	20	55.5	21	24.67	15	24.4	13	29.00	14	62.0	9	16.19	26	26.0	37
Oct. 6.9	1.47	26	53.4	18	24.82	18	23.1	15	29.14	18	61.1	11	16.45	36	22.3	36
16.9	1.73	32	51.6	13	25.00	22	21.6	17	29.32	22	60.0	14	16.81	45	18.7	34
26.9	2.05	38	50.3	8	25.22	25	19.9	19	29.54	25	58.6	16	17.26	54	15.3	32
Nov. 5.8	2.43	43	49.5	2	25.47	29	18.0	21	29.79	28	57.0	18	17.80	61	12.1	29
15.8	2.86	47	49.3	4	25.76	32	15.9	22	30.07	31	55.2	20	18.41	68	9.2	25
25.8	3.33	49	49.7	10	26.08	34	13.7	22	30.38	33	53.2	22	19.09	74	6.7	20
Dec. 5.8	3.82	49	50.7	15	26.42	35	11.5	22	30.71	35	51.0	22	19.83	77	4.7	15
15.7	4.31	48	52.2	21	26.77	34	9.3	21	31.06	34	48.8	22	20.60	77	3.2	9
25.7	4.79	46	54.3	26	27.11	34	7.2	20	31.40	33	46.6	21	21.37	76	2.3	3
35.7	5.25		56.9		27.45		5.2		31.73		44.5		22.13		2.0	
Sec δ, Tan δ	1.702		−1.377		1.019		+0.194		1.002		+0.058		2.897		+2.719	
Mean Place	2^{s}.095		50″.82		23^{s}.377		30″.94		27^{s}.813		67″.91		15^{s}.244		40″.95	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.01		−0.09		0.00		+0.01		0.00		0.00		+0.01		+0.18	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.4		+0.2		−0.4		+0.2		−0.4		+0.2		−0.4		+0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ Hydræ. Mag. 3.7				λ Centauri. Mag. 3.3				υ Leonis. Mag. 4.5				π Chamæleontis. Mag. 5.7			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 11 28		° ′ −31 22		h m 11 31		° ′ −62 31		h m 11 32		° ′ − 0 20		h m 11 33		° ′ −75 24	
	s		″		s		″		s		″		s		″	
Jan. 0.7	43.25		23.6		45.31		59.8		29.93		35.5		39.17		33.4	
10.7	43.60	35	26.3	27	45.84	53	62.4	26	30.26	33	37.7	22	40.05	88	35.8	24
20.6	43.91	31	29.1	28	46.32	48	65.4	30	30.56	30	39.7	20	40.84	79	38.7	29
30.6	44.19	28	32.0	29	46.74	42	68.7	33	30.82	26	41.5	18	41.52	68	42.0	33
Feb. 9.6	44.42	23	35.0	30	47.08	34	72.3	36	31.04	22	43.1	16	42.07	55	45.6	36
19.6	44.60	18	37.9	29	47.34	26	76.0	37	31.22	18	44.4	13	42.48	41	49.4	38
Mar. 1.5	44.74	14	40.6	27	47.52	18	79.8	38	31.36	14	45.5	11	42.75	27	53.3	39
11.5	44.83	9	43.2	26	47.62	10	83.5	37	31.46	10	46.3	8	42.89	14	57.2	39
21.5	44.87	4	45.6	24	47.65	3	87.1	36	31.51	5	46.9	6	42.89	0	61.1	39
31.5	44.87	0	47.7	21	47.61	4	90.5	34	31.53	2	47.2	3	42.76	13	64.8	37
Apr. 10.4	44.84	3	49.5	18	47.50	11	93.7	32	31.52	1	47.3	1	42.51	25	68.3	35
20.4	44.78	6	51.0	15	47.33	17	96.6	29	31.48	4	47.2	1	42.15	36	71.6	33
30.4	44.70	8	52.2	12	47.12	21	99.1	25	31.42	6	47.0	2	41.69	46	74.5	29
May 10.3	44.60	10	53.1	9	46.86	26	101.2	21	31.34	8	46.7	3	41.15	54	76.9	24
20.3	44.48	12	53.7	6	46.57	29	102.8	16	31.25	9	46.3	4	40.54	61	78.9	20
30.3	44.36	12	53.9	2	46.25	32	103.9	11	31.16	9	45.8	5	39.87	67	80.5	16
June 9.3	44.23	13	53.8	1	45.92	33	104.5	6	31.07	9	45.2	6	39.17	70	81.5	10
19.2	44.10	13	53.4	4	45.58	34	104.7	2	30.98	9	44.6	6	38.45	72	82.0	5
29.2	43.97	13	52.7	7	45.24	34	104.4	3	30.89	9	44.0	6	37.72	73	81.9	1
July 9.2	43.85	12	51.7	10	44.91	33	103.6	8	30.81	8	43.4	6	37.02	70	81.2	7
19.2	43.74	11	50.5	12	44.60	31	102.3	13	30.74	7	42.9	5	36.35	67	80.1	11
29.1	43.64	10	49.1	14	44.32	28	100.5	18	30.68	6	42.4	5	35.75	60	78.5	16
Aug. 8.1	43.57	7	47.5	16	44.08	24	98.4	21	30.64	4	41.9	5	35.23	52	76.4	21
18.1	43.52	5	45.8	17	43.90	18	96.0	24	30.62	2	41.5	4	34.81	42	74.0	24
28.0	43.50	2	44.1	17	43.78	12	93.4	26	30.62	0	41.3	2	34.51	30	71.3	27
Sept. 7.0	43.52	2	42.4	17	43.73	5	90.7	27	30.64	2	41.3	0	34.34	17	68.4	29
17.0	43.57	5	40.8	16	43.76	3	88.0	27	30.70	6	41.5	2	34.33	1	65.4	30
27.0	43.67	10	39.4	14	43.88	12	85.3	27	30.79	9	41.9	4	34.48	15	62.5	29
Oct. 6.9	43.81	14	38.3	11	44.08	20	82.8	25	30.92	13	42.5	6	34.79	31	59.7	28
16.9	44.00	19	37.5	8	44.37	29	80.7	21	31.08	16	43.4	9	35.25	46	57.2	25
26.9	44.24	24	37.1	4	44.74	37	79.0	17	31.29	21	44.6	12	35.86	61	55.1	21
Nov. 5.9	44.52	28	37.2	1	45.18	44	77.8	12	31.54	25	46.1	15	36.60	74	53.5	16
15.8	44.83	31	37.7	5	45.69	51	77.1	7	31.82	28	47.8	17	37.45	85	52.4	11
25.8	45.18	35	38.7	10	46.25	56	77.0	1	32.12	30	49.7	19	38.38	93	51.9	5
Dec. 5.8	45.55	37	40.2	15	46.84	59	77.6	6	32.45	33	51.8	21	39.36	98	52.1	2
15.7	45.93	38	42.1	19	47.44	60	78.8	12	32.79	34	54.0	22	40.36	100	52.9	8
25.7	46.30	37	44.3	22	48.03	59	80.6	18	33.13	34	56.3	23	41.34	98	54.4	15
35.7	46.66	36	46.8	25	48.59	56	82.9	23	33.47	34	58.5	22	42.27	93	56.5	21
Sec δ, Tan δ	1.171		−0.610		2.169		−1.924		1.000		−0.006		3.971		−3.843	
Mean Place	43ˢ.219		34″.36		45ˢ.642		78″.19		29ˢ.655		35″.88		39ˢ.922		53″.71	
D′ψ α, Dω α	0.00		−0.04		−0.01		−0.13		0.00		0.00		−0.01		−0.25	
Dψ δ, Dω δ	−0.4		+0.1		−0.4		+0.1		−0.4		+0.1		−0.4		+0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**8 Draconis.** Mag. 5.5				**ζ Crateris.** Mag. 4.9				**χ Ursæ Majoris.** Mag. 3.8				**β Leonis.** Mag. 2.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	11 37		+67 12		11 40		−17 51		11 41		+48 15		11 44		+15 3	
	s		″		s		″		s		″		s		″	
Jan. 0.7	40.05	68	78.0	1	21.15	33	55.2	24	28.75	45	28.2	8	37.77	34	25.1	18
10.7	40.73	64	77.9	5	21.48	31	57.6	25	29.20	42	27.4	2	38.11	32	23.3	15
20.7	41.37	57	78.4	11	21.79	27	60.1	25	29.62	37	27.2	3	38.43	28	21.8	12
30.6	41.94	48	79.5	16	22.06	23	62.6	24	29.99	32	27.5	8	38.71	24	20.6	9
Feb. 9.6	42.42	39	81.1	21	22.29	19	65.0	22	30.31	26	28.3	13	38.95	20	19.7	5
19.6	42.81	28	83.2	24	22.48	15	67.2	21	30.57	19	29.6	17	39.15	16	19.2	2
Mar. 1.5	43.09	17	85.6	27	22.63	10	69.3	19	30.76	13	31.3	19	39.31	11	19.0	1
11.5	43.26	6	88.3	28	22.73	6	71.2	16	30.89	7	33.2	21	39.42	6	19.1	4
21.5	43.32	5	91.1	28	22.79	3	72.8	14	30.96	1	35.3	22	39.48	3	19.5	6
31.5	43.27	14	93.9	27	22.82	1	74.2	11	30.97	5	37.5	23	39.51	1	20.1	8
Apr. 10.4	43.13	23	96.6	24	22.81	4	75.3	9	30.92	10	39.8	22	39.50	3	20.9	9
20.4	42.90	30	99.0	22	22.77	6	76.2	6	30.82	13	42.0	19	39.47	6	21.8	9
30.4	42.60	35	101.2	18	22.71	7	76.8	4	30.69	16	43.9	17	39.41	7	22.7	9
May 10.4	42.25	39	103.0	13	22.64	9	77.2	1	30.53	18	45.6	14	39.34	9	23.6	8
20.3	41.86	41	104.3	9	22.55	10	77.3	1	30.35	19	47.0	10	39.25	10	24.4	8
30.3	41.45	42	105.2	4	22.45	10	77.2	3	30.16	20	48.0	7	39.15	10	25.2	7
June 9.3	41.03	42	105.6	1	22.35	10	76.9	5	29.96	19	48.7	3	39.05	10	25.9	6
19.2	40.61	40	105.5	7	22.25	10	76.4	6	29.77	19	49.0	2	38.95	10	26.5	5
29.2	40.21	37	104.8	12	22.15	10	75.8	8	29.58	17	48.8	6	38.85	9	27.0	3
July 9.2	39.84	33	103.6	16	22.05	9	75.0	9	29.41	16	48.2	10	38.76	8	27.3	1
19.2	39.51	29	102.0	21	21.96	7	74.1	11	29.25	13	47.2	14	38.68	7	27.4	1
29.1	39.22	23	99.9	25	21.89	6	73.0	11	29.12	11	45.8	17	38.61	5	27.3	2
Aug. 8.1	38.99	18	97.4	28	21.83	4	71.9	11	29.01	7	44.1	21	38.56	3	27.1	4
18.1	38.81	11	94.6	31	21.79	2	70.8	11	28.94	4	42.0	23	38.53	1	26.7	7
28.1	38.70	3	91.5	33	21.77	1	69.7	10	28.90	0	39.7	26	38.52	1	26.0	9
Sept. 7.0	38.67	4	88.2	35	21.78	5	68.7	9	28.90	4	37.1	29	38.53	4	25.1	11
17.0	38.71	12	84.7	36	21.83	8	67.8	6	28.94	9	34.2	30	38.57	8	24.0	13
27.0	38.83	21	81.1	37	21.91	12	67.2	4	29.03	14	31.2	31	38.65	12	22.7	15
Oct. 6.9	39.04	29	77.4	37	22.03	17	66.8	1	29.17	20	28.1	32	38.77	15	21.2	18
16.9	39.33	38	73.7	35	22.20	21	66.7	3	29.37	25	24.9	32	38.92	20	19.4	20
26.9	39.71	46	70.2	33	22.41	25	67.0	6	29.62	30	21.7	31	39.12	24	17.4	21
Nov. 5.9	40.17	54	66.9	30	22.66	29	67.6	10	29.92	35	18.6	30	39.36	27	15.3	22
15.8	40.71	60	63.9	26	22.95	32	68.6	14	30.27	40	15.6	28	39.63	31	13.1	23
25.8	41.31	65	61.3	22	23.27	34	70.0	17	30.67	43	12.8	24	39.94	33	10.8	24
Dec. 5.8	41.96	69	59.1	17	23.61	35	71.7	20	31.10	45	10.4	21	40.27	35	8.4	23
15.8	42.65	70	57.4	11	23.96	35	73.7	22	31.55	45	8.3	16	40.62	35	6.1	22
25.7	43.35	69	56.3	5	24.31	35	75.9	24	32.00	45	6.7	10	40.97	34	3.9	19
35.7	44.04		55.8		24.66		78.3		32.45		5.7		41.31		2.0	
Sec δ, Tan δ	2.583		+2.381		1.051		−0.322		1.502		+1.121		1.036		+0.269	
Mean Place	37ˢ.900		95″.26		21ˢ.078		61″.23		27ˢ.729		42″.58		37ˢ.403		30″.40	
D′ψ α, Dω α	+0.01		+0.16		0.00		−0.02		0.00		+0.07		0.00		+0.02	
Dψ δ, Dω δ	−0.4		+0.1		−0.4		+0.1		−0.4		+0.1		−0.4		+0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**β Virginis.** Mag. 3.8				**Groombridge 1830.** Mag. 6.5				**γ Ursæ Majoris.** Mag. 2.5				**π Virginis.** Mag. 4.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	11 46		+ 2 14		11 47		+38 19		11 49		+54 10		11 56		+ 7 5	
	s		″		s		″		s		″		s		″	
Jan. 0.7	10.03		77.3		58.86		82.9		16.84		26.6		25.10		54.9	
10.7	10.36	33	75.2	21	59.26	40	81.6	13	17.34	50	25.9	7	25.43	33	52.9	20
20.7	10.67	31	73.2	20	59.64	38	80.8	8	17.80	46	25.8	1	25.74	31	51.1	18
30.6	10.95	28	71.4	18	59.98	34	80.5	3	18.22	42	26.3	5	26.03	29	49.5	16
Feb. 9.6	11.19	24	69.9	15	60.28	30	80.6	1	18.58	36	27.3	10	26.28	25	48.2	13
19.6	11.39	20	68.7	12	60.53	25	81.2	6	18.88	30	28.8	15	26.49	21	47.3	9
Mar. 1.5	11.54	15	67.8	9	60.72	19	82.2	10	19.11	23	30.6	18	26.65	16	46.6	7
11.5	11.65	11	67.1	7	60.86	14	83.5	13	19.26	15	32.8	22	26.77	12	46.2	4
21.5	11.72	7	66.7	4	60.94	8	85.0	15	19.34	8	35.2	24	26.84	7	46.1	1
31.5	11.75	3	66.5	2	60.97	3	86.7	17	19.35	1	37.7	25	26.88	4	46.3	2
Apr. 10.4	11.75	0	66.6	1	60.96	1	88.4	17	19.30	5	40.1	24	26.89	1	46.6	3
20.4	11.72	3	66.8	2	60.91	5	90.1	17	19.19	11	42.4	23	26.87	2	47.0	4
30.4	11.67	5	67.1	3	60.83	8	91.7	16	19.03	16	44.5	21	26.83	4	47.6	6
May 10.4	11.61	6	67.5	4	60.72	11	93.1	14	18.84	19	46.4	19	26.77	6	48.3	7
20.3	11.53	8	68.0	5	60.60	12	94.3	12	18.63	21	47.9	15	26.69	8	49.0	7
30.3	11.45	8	68.6	6	60.47	13	95.2	9	18.40	23	49.0	11	26.61	8	49.7	7
June 9.3	11.36	9	69.2	6	60.33	14	95.8	6	18.16	24	49.7	7	26.52	9	50.3	6
19.2	11.27	9	69.8	6	60.19	14	96.1	3	17.93	23	49.9	2	26.43	9	50.9	6
29.2	11.18	9	70.4	6	60.05	14	96.0	1	17.70	23	49.7	2	26.34	9	51.5	6
July 9.2	11.10	8	70.9	5	59.93	12	95.6	4	17.48	22	49.0	7	26.25	9	52.0	5
19.2	11.02	8	71.4	5	59.82	11	94.8	8	17.28	20	47.9	11	26.17	8	52.4	4
29.1	10.95	7	71.8	4	59.73	9	93.7	11	17.11	17	46.4	15	26.09	8	52.6	2
Aug. 8.1	10.90	5	72.1	3	59.65	8	92.3	14	16.97	14	44.5	19	26.03	6	52.7	1
18.1	10.87	3	72.3	2	59.60	5	90.6	17	16.86	11	42.2	23	25.99	4	52.6	1
28.1	10.86	1	72.3	0	59.58	2	88.6	20	16.79	7	39.6	26	25.97	2	52.4	2
Sept. 7.0	10.88	2	72.2	1	59.59	1	86.3	23	16.77	2	36.8	28	25.97	0	52.0	4
17.0	10.92	4	71.9	3	59.63	4	83.7	26	16.80	3	33.7	31	26.00	3	51.4	6
27.0	11.00	8	71.3	6	59.72	9	81.0	27	16.88	8	30.4	33	26.07	7	50.6	8
Oct. 6.9	11.12	12	70.5	8	59.85	13	78.1	29	17.02	14	27.1	33	26.18	11	49.5	11
16.9	11.27	15	69.4	11	60.03	18	75.1	30	17.22	20	23.7	34	26.32	14	48.2	13
26.9	11.47	20	68.1	13	60.26	23	72.0	31	17.48	26	20.3	34	26.51	19	46.6	16
Nov. 5.9	11.71	24	66.5	16	60.53	27	68.9	31	17.80	32	17.0	33	26.74	23	44.8	18
15.8	11.98	27	64.7	18	60.85	32	65.9	30	18.17	37	13.9	31	27.00	26	42.8	20
25.8	12.28	30	62.7	20	61.20	35	63.0	29	18.59	42	11.1	28	27.29	29	40.7	21
Dec. 5.8	12.61	33	60.6	21	61.59	39	60.3	27	19.05	46	8.6	25	27.61	32	38.4	23
15.8	12.95	34	58.4	22	62.00	41	57.9	24	19.54	49	6.6	20	27.95	34	36.1	23
25.7	13.29	34	56.1	23	62.41	41	55.9	20	20.04	50	5.0	16	28.30	35	33.9	22
35.7	13.63	34	53.9	22	62.83	42	54.3	16	20.55	51	4.0	10	28.64	34	31.8	21
Sec δ, Tan δ	1.001		+0.039		1.275		+0.791		1.708		+1.385		1.008		+0.124	
Mean Place	9ˢ.810		78″.30		58ˢ.139		95″.31		15ˢ.673		42″.55		24ˢ.883		58″.02	
D′ψ α, Dω α	0.00		0.00		0.00		+0.05		0.00		+0.09		0.00		+0.01	
Dψ δ, Dω δ	−0.4		+0.1		−0.4		+0.1		−0.4		0.0		−0.4		0.0	

Mean Solar Date.	**ο Virginis.** Mag. 4.2				**δ Centauri.** Mag. 2.9				**ε Corvi.** Mag. 3.2				**4 H. Draconis.** Mag. 5.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	12 0		+9 12		12 3		−50 14		12 5		−22 8		12 8		+78 5	
	s		″		s		″		s		″		s		″	
Jan. 0.7	46.88	34	54.0	20	50.14	45	1.8	24	38.75	35	2.7	24	11.73	119	39.0	2
10.7	47.22	32	52.0	18	50.59	41	4.2	27	39.10	33	5.1	25	12.92	114	38.8	4
20.7	47.54	29	50.2	15	51.00	37	6.9	30	39.43	30	7.6	26	14.06	105	39.2	11
30.6	47.83	25	48.7	12	51.37	32	9.9	32	39.73	26	10.2	25	15.11	92	40.3	17
Feb. 9.6	48.08	21	47.5	8	51.69	27	13.1	33	39.99	21	12.7	24	16.03	77	42.0	21
19.6	48.29	17	46.7	5	51.96	21	16.4	34	40.20	17	15.1	22	16.80	58	44.1	25
Mar. 1.6	48.46	12	46.2	3	52.17	15	19.8	33	40.37	13	17.3	21	17.38	39	46.6	28
11.5	48.58	8	45.9	0	52.32	9	23.1	32	40.50	9	19.4	19	17.77	19	49.4	30
21.5	48.66	5	45.9	3	52.41	4	26.3	31	40.59	5	21.3	16	17.96	2	52.4	30
31.5	48.71	1	46.2	5	52.45	0	29.4	28	40.64	2	22.9	14	17.94	21	55.4	29
Apr. 10.5	48.72	2	46.7	6	52.45	5	32.2	26	40.66	1	24.3	11	17.73	38	58.3	28
20.4	48.70	4	47.3	7	52.40	9	34.8	22	40.65	4	25.4	9	17.35	54	61.1	25
30.4	48.66	6	48.0	7	52.31	12	37.0	19	40.61	6	26.3	6	16.81	66	63.6	21
May 10.4	48.60	7	48.7	8	52.19	15	38.9	15	40.55	7	26.9	4	16.15	76	65.7	16
20.3	48.53	9	49.5	7	52.04	17	40.4	11	40.48	9	27.3	2	15.39	84	67.3	11
30.3	48.44	9	50.2	7	51.87	19	41.5	7	40.39	10	27.5	1	14.55	89	68.4	5
June 9.3	48.35	9	50.9	6	51.68	20	42.2	2	40.29	10	27.4	4	13.66	90	68.9	0
19.3	48.26	9	51.5	6	51.48	21	42.4	2	40.19	11	27.0	5	12.76	89	68.9	5
29.2	48.17	9	52.1	4	51.27	21	42.2	6	40.08	11	26.5	7	11.87	86	68.4	11
July 9.2	48.08	8	52.5	3	51.06	20	41.6	10	39.97	10	25.8	9	11.01	81	67.3	16
19.2	48.00	8	52.8	2	50.86	19	40.6	14	39.87	10	24.9	10	10.20	74	65.7	21
29.2	47.92	7	53.0	0	50.67	16	39.2	17	39.77	8	23.9	11	9.46	65	63.6	25
Aug. 8.1	47.85	5	53.0	1	50.51	14	37.5	20	39.69	7	22.8	12	8.81	54	61.1	29
18.1	47.80	2	52.9	3	50.37	10	35.5	22	39.62	4	21.6	12	8.27	42	58.2	32
28.1	47.78	0	52.6	5	50.27	6	33.3	23	39.58	1	20.4	12	7.85	29	55.0	35
Sept. 7.0	47.78	3	52.1	8	50.21	0	31.0	23	39.57	2	19.2	11	7.56	14	51.5	37
17.0	47.81	6	51.3	10	50.21	6	28.7	22	39.59	6	18.1	9	7.42	0	47.8	38
27.0	47.87	10	50.3	12	50.27	12	26.5	21	39.65	10	17.2	6	7.42	16	44.0	39
Oct. 7.0	47.97	14	49.1	14	50.39	18	24.4	18	39.75	14	16.6	4	7.58	32	40.1	39
16.9	48.11	18	47.7	17	50.57	25	22.6	15	39.89	19	16.2	1	7.90	49	36.2	38
26.9	48.29	22	46.0	19	50.82	31	21.1	10	40.08	24	16.1	3	8.39	65	32.4	35
Nov. 5.9	48.51	26	44.1	21	51.13	37	20.1	5	40.32	27	16.4	7	9.04	80	28.9	32
15.9	48.77	30	42.0	22	51.50	41	19.6	0	40.59	31	17.1	11	9.84	93	25.7	29
25.8	49.07	32	39.8	22	51.91	45	19.6	5	40.90	34	18.2	15	10.77	104	22.8	24
Dec. 5.8	49.39	34	37.6	23	52.36	47	20.1	11	41.24	35	19.7	18	11.81	112	20.4	19
15.8	49.73	35	35.3	22	52.83	47	21.2	16	41.59	36	21.5	21	12.93	118	18.5	13
25.7	50.08	34	33.1	21	53.30	46	22.8	21	41.95	36	23.6	23	14.11	120	17.2	6
35.7	50.42		31.0		53.76		24.9		42.31		25.9		15.31		16.6	
Sec δ, Tan δ	1.013		+0.162		1.564		−1.202		1.080		−0.407		4.848		+4.743	
Mean Place	46ˢ.680		58″.00		50ˢ.606		16″.90		38ˢ.882		9″.45		8ˢ.259		58″.76	
D′ψ α, Dω α	0.00		+0.01		0.00		−0.08		0.00		−0.03		0.00		+0.32	
Dψ δ, Dω δ	−0.4		0.0		−0.4		0.0		−0.4		0.0		−0.4		0.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**δ Crucis.** Mag. 3.1				**δ Ursæ Majoris.** Mag. 3.4				**γ Corvi.** Mag. 2.8				**2 Canum Venat.** Mag. 5.8			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	12 10		−58 15		12 11		+57 30		12 11		−17 3		12 11		+41 8	
	s		″		s		″		s		″		s		″	
Jan. 0.7	30.65	52	38.3	22	8.76	53	39.9	8	19.67	34	27.0	23	46.89	41	25.3	13
10.7	31.17	49	40.5	26	9.29	51	39.1	2	20.01	32	29.3	24	47.30	39	24.0	8
20.7	31.66	44	43.1	30	9.80	47	38.9	4	20.33	30	31.7	24	47.69	36	23.2	2
30.6	32.10	38	46.1	33	10.27	41	39.3	9	20.63	26	34.1	23	48.05	32	23.0	3
Feb. 9.6	32.48	32	49.4	35	10.68	35	40.2	14	20.89	22	36.4	22	48.37	27	23.3	7
19.6	32.80	25	52.9	35	11.03	27	41.6	19	21.11	18	38.6	20	48.64	22	24.0	11
Mar. 1.6	33.05	18	56.4	35	11.30	20	43.5	22	21.29	13	40.6	18	48.86	16	25.1	15
11.5	33.23	11	59.9	35	11.50	12	45.7	25	21.42	9	42.4	16	49.02	10	26.6	18
21.5	33.34	5	63.4	34	11.62	4	48.2	26	21.51	6	44.0	13	49.12	5	28.4	20
31.5	33.39	1	66.8	32	11.66	3	50.8	26	21.57	2	45.3	11	49.17	1	30.4	21
Apr. 10.5	33.38	6	70.0	29	11.63	9	53.4	25	21.59	0	46.4	9	49.18	4	32.5	21
20.4	33.32	11	72.9	26	11.54	15	55.9	24	21.59	3	47.3	6	49.14	8	34.6	20
30.4	33.21	15	75.5	22	11.39	19	58.3	21	21.56	5	47.9	4	49.06	11	36.6	18
May 10.4	33.06	19	77.7	18	11.20	22	60.4	17	21.51	7	48.3	2	48.95	13	38.4	16
20.3	32.87	22	79.5	14	10.98	25	62.1	13	21.44	8	48.5	0	48.82	14	40.0	13
30.3	32.65	24	80.9	10	10.73	27	63.4	9	21.36	9	48.5	2	48.68	15	41.3	9
June 9.3	32.41	27	81.9	5	10.46	28	64.3	4	21.27	10	48.3	4	48.53	16	42.2	6
19.3	32.14	28	82.4	0	10.18	27	64.7	0	21.17	10	47.9	5	48.37	16	42.8	3
29.2	31.86	28	82.4	4	9.91	26	64.7	5	21.07	10	47.4	7	48.21	16	43.1	1
July 9.2	31.58	27	82.0	9	9.65	25	64.2	10	20.97	10	46.7	8	48.05	15	43.0	5
19.2	31.31	26	81.1	13	9.40	22	63.2	14	20.87	9	45.9	9	47.90	13	42.5	9
29.2	31.05	23	79.8	17	9.18	19	61.8	19	20.78	8	45.0	9	47.77	12	41.6	13
Aug. 8.1	30.82	20	78.1	20	8.99	16	59.9	23	20.70	6	44.1	10	47.65	9	40.3	16
18.1	30.62	15	76.1	23	8.83	12	57.6	26	20.64	4	43.1	10	47.56	7	38.7	19
28.1	30.47	9	73.8	25	8.71	8	55.0	29	20.60	2	42.1	9	47.49	3	36.8	22
Sept. 7.0	30.38	3	71.3	26	8.63	2	52.1	31	20.58	2	41.2	8	47.46	0	34.6	25
17.0	30.35	4	68.7	25	8.61	4	49.0	34	20.60	5	40.4	6	47.46	5	32.1	27
27.0	30.39	12	66.2	24	8.65	10	45.6	35	20.65	9	39.8	4	47.51	9	29.4	29
Oct. 7.0	30.51	20	63.8	22	8.75	17	42.1	35	20.74	14	39.4	1	47.60	14	26.5	30
16.9	30.71	28	61.6	18	8.92	23	38.6	36	20.88	18	39.3	2	47.74	19	23.5	31
26.9	30.99	35	59.8	14	9.15	30	35.0	35	21.06	22	39.5	6	47.93	25	20.4	31
Nov. 5.9	31.34	42	58.4	9	9.45	36	31.5	33	21.28	26	40.1	9	48.18	29	17.3	31
15.9	31.76	48	57.5	4	9.81	42	28.2	30	21.54	30	41.0	13	48.47	33	14.2	30
25.8	32.24	52	57.1	2	10.23	47	25.2	27	21.84	33	42.3	16	48.80	37	11.2	27
Dec. 5.8	32.76	54	57.3	8	10.70	51	22.5	23	22.17	35	43.9	18	49.17	40	8.5	24
15.8	33.30	55	58.1	14	11.21	53	20.2	17	22.52	36	45.7	21	49.57	41	6.1	20
25.7	33.85	54	59.5	19	11.74	54	18.5	12	22.88	35	47.8	23	49.98	42	4.1	16
35.7	34.39		61.4		12.28		17.3		23.23		50.1		50.40		2.5	
Sec δ, Tan δ	1.901		−1.617		1.862		+1.570		1.046		−0.307		1.328		+0.874	
Mean Place	31ˢ.364		55″.07		7ˢ.678		57″.57		19ˢ.778		31″.82		46ˢ.291		39″.53	
$D'_\psi \alpha$, $D_\omega \alpha$	0.00		−0.11		0.00		+0.10		0.00		−0.02		0.00		+0.06	
$D_\psi \delta$, $D_\omega \delta$	-0.4		0.0		−0.4		0.0		−0.4		0.0		−0.4		−0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Chamæleontis. Mag. 4.4				η Virginis. Mag. 4.0				α¹ Crucis. Mag. 1.6				20 Comæ. Mag. 5.7			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	12 13		−78 49		12 15		− 0 11		12 21		−62 36		12 25		+21 22	
	s		″		s		″		s		″		s		″	
Jan. 0.7	10.82		25.1		27.31		1.5		43.94		44.2		21.34		31.0	
10.7	12.03	121	26.9	18	27.65	34	3.7	22	44.54	60	46.2	20	21.70	36	29.1	19
20.7	13.16	113	29.3	24	27.97	32	5.8	21	45.09	55	48.7	25	22.04	34	27.6	15
30.7	14.18	102	32.2	29	28.26	29	7.6	18	45.59	50	51.6	29	22.36	32	26.5	11
Feb. 9.6	15.06	88	35.4	32	28.52	26	9.2	16	46.03	44	54.8	32	22.64	28	25.8	7
19.6	15.78	72	38.9	35	28.74	22	10.6	14	46.40	37	58.2	34	22.88	24	25.5	3
Mar. 1.6	16.34	56	42.6	37	28.92	18	11.7	11	46.70	30	61.7	35	23.08	20	25.6	1
11.5	16.72	38	46.5	39	29.06	14	12.5	8	46.93	23	65.3	36	23.23	15	26.0	4
21.5	16.93	21	50.4	39	29.16	10	13.0	5	47.08	15	68.9	36	23.34	11	26.7	7
31.5	16.97	4	54.3	39	29.22	6	13.3	3	47.15	7	72.4	35	23.41	7	27.7	10
Apr. 10.5	16.85	12	58.0	37	29.25	3	13.4	1	47.16	1	75.7	33	23.44	3	28.9	12
20.4	16.57	28	61.5	35	29.25	0	13.3	1	47.11	5	78.8	31	23.44	0	30.1	12
30.4	16.15	42	64.8	33	29.22	3	13.1	2	47.00	11	81.6	28	23.41	3	31.4	13
May 10.4	15.60	55	67.7	29	29.17	5	12.7	4	46.83	17	84.1	25	23.36	5	32.7	13
20.4	14.93	67	70.2	25	29.11	6	12.2	5	46.62	21	86.2	21	23.29	7	33.9	12
30.3	14.15	78	72.3	21	29.04	7	11.7	5	46.37	25	87.9	17	23.20	9	35.0	11
June 9.3	13.30	85	73.9	16	28.96	8	11.2	5	46.08	29	89.1	12	23.10	10	36.0	10
19.3	12.39	91	74.9	10	28.87	9	10.6	6	45.77	31	89.8	7	23.00	10	36.8	8
29.2	11.44	95	75.4	5	28.78	9	10.0	6	45.44	33	90.1	3	22.89	11	37.4	6
July 9.2	10.49	95	75.4	0	28.69	9	9.4	6	45.11	33	89.9	2	22.78	11	37.7	3
19.2	9.56	93	74.8	6	28.60	9	8.9	5	44.78	33	89.2	7	22.68	10	37.8	1
29.2	8.67	89	73.7	11	28.52	8	8.4	5	44.46	32	88.0	12	22.58	10	37.6	2
Aug. 8.1	7.86	81	72.1	16	28.45	7	8.0	4	44.17	29	86.4	16	22.49	9	37.2	4
18.1	7.16	70	70.0	21	28.39	6	7.7	3	43.92	25	84.4	20	22.42	7	36.5	7
28.1	6.60	56	67.6	24	28.35	4	7.6	1	43.72	20	82.1	23	22.37	5	35.6	9
Sept. 7.1	6.21	39	64.9	27	28.34	1	7.6	0	43.58	14	79.6	25	22.34	3	34.5	11
17.0	6.00	21	62.0	29	28.35	1	7.8	2	43.51	7	77.0	26	22.34	0	33.1	14
27.0	5.99	1	59.0	30	28.39	4	8.2	4	43.53	2	74.4	26	22.38	4	31.4	17
Oct. 7.0	6.19	20	56.1	29	28.48	9	8.8	6	43.64	11	71.8	26	22.45	7	29.5	19
16.9	6.60	41	53.3	28	28.61	13	9.7	9	43.84	20	69.4	24	22.56	11	27.4	21
26.9	7.22	62	50.8	25	28.78	17	10.9	12	44.13	29	67.4	20	22.72	16	25.1	23
Nov. 5.9	8.03	81	48.7	21	28.99	21	12.3	14	44.51	38	65.7	17	22.92	20	22.6	25
15.9	9.01	98	47.1	16	29.24	25	14.0	17	44.96	45	64.5	12	23.17	25	20.0	26
25.8	10.12	111	46.0	11	29.53	29	15.9	19	45.48	52	63.9	6	23.46	29	17.4	26
Dec. 5.8	11.33	121	45.5	5	29.84	31	18.0	21	46.05	57	63.8	1	23.78	32	14.8	26
15.8	12.60	127	45.7	2	30.17	33	20.2	22	46.65	60	64.3	5	24.12	34	12.4	24
25.8	13.89	129	46.5	8	30.51	34	22.4	22	47.26	61	65.4	11	24.48	36	10.1	23
35.7	15.15	126	48.0	15	30.86	35	24.6	22	47.87	61	67.1	17	24.84	36	8.0	21
Sec δ, Tan δ	5.163		−5.065		1.000		−0.003		2.174		−1.931		1.074		+0.391	
Mean Place	13ˢ.034		44″.95		27ˢ.290		0″.20		44ˢ.933		61″.45		21ˢ.144		40″.01	
D′ψ α, Dω α	+0.01		−0.34		0.00		0.00		0.00		−0.13		0.00		+0.03	
Dψ δ, Dω δ	−0.4		−0.1		−0.4		−0.1		−0.4		−0.1		−0.4		−0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**δ Corvi.** Mag. 3.1				**γ Crucis.** Mag. 1.6				**8 Canum Venat.** Mag. 4.3				**κ Draconis.** Mag. 3.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	12 25		−16 1		12 26		−56 37		12 29		+41 49		12 29		+70 15	
	s		″		s		″		s		″		s		″	
Jan. 0.7	21.47		48.3		18.97		17.6		37.39		33.1		48.25		43.6	
10.7	21.82	35	50.6	23	19.49	52	19.7	21	37.80	41	31.6	15	49.02	77	42.9	7
20.7	22.15	33	52.9	23	19.98	49	22.2	25	38.20	40	30.7	9	49.77	75	42.8	1
30.7	22.45	30	55.2	23	20.42	44	25.0	28	38.57	37	30.3	4	50.47	70	43.3	5
Feb. 9.6	22.72	27	57.4	22	20.81	39	28.1	31	38.90	33	30.5	2	51.10	63	44.5	12
19.6	22.95	23	59.5	21	21.15	34	31.4	33	39.19	29	31.2	7	51.64	54	46.2	17
Mar. 1.6	23.14	19	61.4	19	21.42	27	34.8	34	39.43	24	32.3	11	52.08	44	48.4	22
11.5	23.29	15	63.2	18	21.63	21	38.3	35	39.61	18	33.8	15	52.40	32	51.0	26
21.5	23.40	11	64.7	15	21.77	14	41.7	34	39.73	12	35.6	18	52.60	20	53.8	28
31.5	23.47	7	66.0	13	21.85	8	45.0	33	39.80	7	37.6	20	52.67	7	56.7	29
Apr. 10.5	23.51	4	67.0	10	21.88	3	48.1	31	39.82	2	39.7	21	52.63	4	59.6	29
20.4	23.52	1	67.8	8	21.86	2	51.0	29	39.80	2	41.9	22	52.48	15	62.4	28
30.4	23.50	2	68.4	6	21.79	7	53.6	26	39.74	6	44.0	21	52.23	25	65.0	26
May 10.4	23.46	4	68.8	4	21.67	12	55.9	23	39.64	10	46.0	20	51.90	33	67.3	23
20.4	23.40	6	69.0	2	21.51	16	57.8	19	39.52	12	47.7	17	51.50	40	69.2	19
30.3	23.33	7	69.0	0	21.32	19	59.4	16	39.38	14	49.2	15	51.05	45	70.7	15
June 9.3	23.25	8	68.8	2	21.11	21	60.5	11	39.22	16	50.4	12	50.57	48	71.7	10
19.3	23.16	9	68.5	3	20.87	24	61.1	6	39.06	16	51.2	8	50.06	51	72.2	5
29.2	23.06	10	68.0	5	20.62	25	61.3	2	38.89	17	51.6	4	49.55	51	72.1	1
July 9.2	22.96	10	67.4	6	20.36	26	61.0	3	38.73	16	51.6	0	49.04	51	71.5	6
19.2	22.86	10	66.6	8	20.10	26	60.3	7	38.57	16	51.2	4	48.56	48	70.3	12
29.2	22.77	9	65.8	8	19.85	25	59.2	11	38.42	15	50.4	8	48.11	45	68.7	16
Aug. 8.1	22.68	9	64.9	9	19.62	23	57.7	15	38.28	14	49.3	11	47.70	41	66.6	21
18.1	22.60	8	64.0	9	19.42	20	55.8	19	38.16	12	47.8	15	47.35	35	64.1	25
28.1	22.55	5	63.1	9	19.26	16	53.6	22	38.07	9	45.9	19	47.06	29	61.2	29
Sept. 7.1	22.52	3	62.3	8	19.15	11	51.2	24	38.01	6	43.7	22	46.84	22	58.0	32
17.0	22.52	0	61.6	7	19.10	5	48.8	24	37.99	2	41.3	24	46.71	13	54.5	35
27.0	22.56	4	61.1	5	19.12	2	46.4	24	38.01	2	38.6	27	46.67	4	50.8	37
Oct. 7.0	22.64	8	60.8	3	19.21	9	44.0	24	38.07	6	35.7	29	46.72	5	47.0	38
16.9	22.76	12	60.7	1	19.38	17	41.8	22	38.18	11	32.6	31	46.87	15	43.2	38
26.9	22.93	17	60.9	2	19.63	25	39.9	19	38.34	16	29.4	32	47.13	26	39.4	38
Nov. 5.9	23.14	21	61.5	6	19.95	32	38.5	14	38.56	22	26.2	32	47.50	37	35.7	37
15.9	23.40	26	62.4	9	20.34	39	37.5	10	38.83	27	23.0	32	47.97	47	32.2	35
25.8	23.69	29	63.7	13	20.78	44	37.0	5	39.15	32	20.0	30	48.53	56	29.1	31
Dec. 5.8	24.01	32	65.3	16	21.27	49	37.1	1	39.51	36	17.2	28	49.17	64	26.3	28
15.8	24.35	34	67.1	18	21.79	52	37.8	7	39.90	39	14.6	26	49.87	70	24.0	23
25.8	24.70	35	69.1	20	22.32	53	39.0	12	40.31	41	12.4	22	50.62	75	22.3	17
35.7	25.05	35	71.4	23	22.85	53	40.8	18	40.72	41	10.7	17	51.39	77	21.2	11
Sec δ, Tan δ	1.040		−0.287		1.818		−1.518		1.342		+0.895		2.961		+2.787	
Mean Place	21ˢ.660		52″.20		19ˢ.814		33″.55		36ˢ.912		48″.21		46ˢ.614		63″.72	
D′ψ α, Dω α	0.00		−0.02		0.00		−0.10		0.00		+0.06		−0.01		+0.18	
Dψ δ, Dω δ	−0.4		−0.1		−0.4		−0.1		−0.4		−0.1		−0.4		−0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**β Corvi.** Mag. 2.8				**24 Comæ** *seq.* Mag. 5.2				**α Muscæ.** Mag. 2.9				**χ Virginis.** Mag. 4.8			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	12 29		−22 54		12 30		+18 50		12 31		−68 39		12 34		− 7 31	
	s		″		s		″		s		″		s		″	
Jan. 0.7	48.53		50.5		46.13		72.5		57.46		4.7		45.10		0.4	
10.7	48.89	36	52.8	23	46.48	35	70.5	20	58.18	72	6.5	18	45.44	34	2.6	22
20.7	49.23	34	55.2	24	46.82	34	68.9	16	58.86	68	8.7	22	45.77	33	4.8	22
30.7	49.54	31	57.7	25	47.13	31	67.7	12	59.49	63	11.4	27	46.07	30	6.9	21
Feb. 9.6	49.82	28	60.1	24	47.41	28	66.9	8	60.05	56	14.5	31	46.34	27	8.8	19
19.6	50.06	24	62.4	23	47.65	24	66.4	5	60.52	47	17.9	34	46.58	24	10.5	17
Mar. 1.6	50.26	20	64.6	22	47.85	20	66.3	1	60.91	39	21.5	36	46.78	20	12.0	15
11.6	50.42	16	66.7	21	48.01	16	66.6	3	61.21	30	25.2	37	46.93	15	13.2	12
21.5	50.54	12	68.6	19	48.13	12	67.2	6	61.41	20	28.9	37	47.05	12	14.2	10
31.5	50.62	8	70.3	17	48.20	7	68.1	9	61.52	11	32.5	36	47.13	8	14.9	7
Apr. 10.5	50.66	4	71.7	14	48.24	4	69.1	10	61.54	2	36.0	35	47.18	5	15.4	5
20.4	50.67	1	72.9	12	48.25	1	70.2	11	61.48	6	39.4	34	47.20	2	15.7	3
30.4	50.66	1	73.9	10	48.23	2	71.4	12	61.35	13	42.5	31	47.19	1	15.9	2
May 10.4	50.62	4	74.6	7	48.18	5	72.6	12	61.15	20	45.2	27	47.16	3	15.9	0
20.4	50.56	6	75.1	5	48.11	7	73.8	12	60.88	27	47.6	24	47.11	5	15.7	2
30.3	50.49	7	75.4	3	48.03	8	74.9	11	60.55	33	49.6	20	47.05	6	15.4	3
June 9.3	50.40	9	75.5	1	47.94	9	75.8	9	60.18	37	51.1	15	46.98	7	15.0	4
19.3	50.30	10	75.3	2	47.84	10	76.6	8	59.77	41	52.1	10	46.90	8	14.5	5
29.3	50.20	10	74.9	4	47.74	10	77.2	6	59.33	44	52.6	5	46.81	9	14.0	5
July 9.2	50.09	11	74.3	6	47.63	11	77.6	4	58.88	45	52.6	0	46.71	10	13.4	6
19.2	49.98	11	73.5	8	47.53	10	77.8	2	58.43	45	52.1	5	46.61	10	12.8	6
29.2	49.87	11	72.6	9	47.43	10	77.8	0	58.00	43	51.1	10	46.52	9	12.2	6
Aug. 8.1	49.77	10	71.6	10	47.34	9	77.5	3	57.60	40	49.6	15	46.44	8	11.6	6
18.1	49.69	8	70.5	11	47.27	7	77.0	5	57.24	36	47.7	19	46.37	7	11.0	6
28.1	49.63	6	69.3	12	47.21	6	76.2	8	56.94	30	45.5	22	46.31	6	10.5	5
Sept. 7.1	49.59	4	68.2	11	47.18	3	75.2	10	56.72	22	43.0	25	46.28	3	10.1	4
17.0	49.58	1	67.1	11	47.18	0	73.9	13	56.60	12	40.3	27	46.27	1	9.9	2
27.0	49.61	3	66.1	10	47.21	3	72.4	15	56.58	2	37.5	28	46.30	3	9.9	0
Oct. 7.0	49.69	8	65.4	7	47.27	6	70.6	18	56.67	9	34.7	28	46.37	7	10.1	2
17.0	49.81	12	65.0	4	47.38	11	68.6	20	56.88	21	32.1	26	46.48	11	10.5	4
26.9	49.98	17	64.8	2	47.53	15	66.4	22	57.20	32	29.8	23	46.63	15	11.2	7
Nov. 5.9	50.20	22	65.0	2	47.73	20	64.1	23	57.63	43	27.8	20	46.83	20	12.2	10
15.9	50.46	26	65.6	6	47.97	24	61.6	25	58.16	53	26.3	15	47.07	24	13.5	13
25.8	50.76	30	66.5	9	48.25	28	59.0	26	58.78	62	25.3	10	47.35	28	15.1	16
Dec. 5.8	51.09	33	67.8	13	48.56	31	56.5	25	59.47	69	24.9	4	47.66	31	16.9	18
15.8	51.44	35	69.4	16	48.90	34	54.0	25	60.20	73	25.1	2	47.99	33	18.9	20
25.8	51.80	36	71.3	19	49.25	35	51.7	23	60.94	74	26.0	9	48.33	34	21.0	21
35.7	52.17	37	73.5	22	49.61	36	49.6	21	61.68	74	27.4	14	48.67	34	23.2	22
Sec δ, Tan δ	1.086		−0.423		1.057		+0.341		2.748		−2.559		1.009		−0.132	
Mean Place	$48^{s}.823$		56″.66		$45^{s}.989$		80″.91		$58^{s}.907$		22″.66		$45^{s}.261$		0″.96	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	0.00		−0.03		0.00		+0.02		+0.01		−0.17		0.00		−0.01	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.4		−0.1		−0.4		−0.1		−0.4		−0.1		−0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Centauri. Mag. 2.4				γ Virginis (*mean*). Mag. 2.9				ρ Virginis. Mag. 5.0				76 Ursæ Majoris. Mag. 5.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 12 36		° ′ −48 28		h m 12 37		° ′ − 0 58		h m 12 37		° ′ +10 42		h m 12 37		° ′ +63 10	
	s		″		s		″		s		″		s		″	
Jan. 0.7	42.04		42.2		15.03		22.3		28.91		47.4		47.15		66.4	
10.7	42.50	46	44.3	21	15.37	34	24.5	22	29.25	34	45.3	21	47.76	61	65.4	10
20.7	42.93	43	46.7	24	15.69	32	26.6	21	29.58	33	43.5	18	48.35	59	65.0	4
30.7	43.32	39	49.4	27	15.99	30	28.5	19	29.89	31	42.0	15	48.91	56	65.3	3
Feb. 9.6	43.67	35	52.3	29	16.26	27	30.2	17	30.17	28	40.8	12	49.41	50	66.2	9
19.6	43.98	31	55.4	31	16.49	23	31.6	14	30.41	24	39.9	9	49.85	44	67.6	14
Mar. 1.6	44.24	26	58.6	32	16.69	20	32.7	11	30.61	20	39.4	5	50.21	36	69.5	19
11.6	44.44	20	61.7	31	16.85	16	33.6	9	30.77	16	39.2	2	50.48	27	71.8	23
21.5	44.59	15	64.8	31	16.97	12	34.2	6	30.89	12	39.3	1	50.66	18	74.4	26
31.5	44.69	10	67.8	30	17.05	8	34.5	3	30.97	8	39.7	4	50.75	9	77.2	28
Apr. 10.5	44.74	5	70.6	28	17.10	5	34.6	1	31.02	5	40.3	6	50.75	0	80.0	28
20.4	44.74	0	73.1	25	17.12	2	34.6	0	31.04	2	41.0	7	50.67	8	82.7	27
30.4	44.71	3	75.4	23	17.11	1	34.4	2	31.03	1	41.8	8	50.52	15	85.3	26
May 10.4	44.64	7	77.4	20	17.08	3	34.0	4	31.00	3	42.7	9	50.31	21	87.7	24
20.4	44.54	10	79.1	17	17.04	4	33.5	5	30.95	5	43.7	10	50.05	26	89.7	20
30.3	44.41	13	80.4	13	16.98	6	33.0	5	30.88	7	44.6	9	49.75	30	91.3	16
June 9.3	44.26	15	81.3	9	16.90	8	32.4	6	30.80	8	45.4	8	49.42	33	92.4	11
19.3	44.09	17	81.8	5	16.82	8	31.8	6	30.71	9	46.1	7	49.07	35	93.1	7
29.3	43.90	19	81.9	1	16.73	9	31.2	6	30.62	9	46.7	6	48.71	36	93.3	2
July 9.2	43.70	20	81.6	3	16.64	9	30.7	5	30.52	10	47.2	5	48.36	35	92.9	4
19.2	43.50	20	80.9	7	16.54	10	30.2	5	30.42	10	47.6	4	48.02	34	92.0	9
29.2	43.31	19	79.9	10	16.45	9	29.7	5	30.33	9	47.8	2	47.70	32	90.7	13
Aug. 8.1	43.13	18	78.5	14	16.36	9	29.3	4	30.24	9	47.8	0	47.41	29	88.9	18
18.1	42.97	16	76.8	17	16.28	8	29.0	3	30.17	7	47.6	2	47.15	26	86.7	22
28.1	42.84	13	74.9	19	16.22	6	28.8	2	30.11	6	47.3	3	46.93	22	84.1	26
Sept. 7.1	42.75	9	72.8	21	16.19	3	28.7	1	30.07	4	46.7	6	46.77	16	81.1	30
17.0	42.71	4	70.6	22	16.18	1	28.8	1	30.06	1	45.9	8	46.67	10	77.8	33
27.0	42.72	1	68.4	22	16.20	2	29.2	4	30.09	3	44.8	11	46.64	3	74.3	35
Oct. 7.0	42.79	7	66.4	20	16.27	7	29.8	6	30.15	6	43.5	13	46.68	4	70.7	36
17.0	42.92	13	64.6	18	16.38	11	30.6	8	30.25	10	42.0	15	46.79	11	67.0	37
26.9	43.12	20	63.0	16	16.53	15	31.7	11	30.40	15	40.2	18	46.99	20	63.2	38
Nov. 5.9	43.39	27	61.8	12	16.72	19	33.1	14	30.59	19	38.2	20	47.27	28	59.5	37
15.9	43.72	33	61.0	8	16.95	23	34.7	16	30.82	23	36.1	21	47.63	36	56.0	35
25.8	44.10	38	60.8	2	17.22	27	36.6	19	31.09	27	33.8	23	48.06	43	52.8	32
Dec. 5.8	44.52	42	61.1	3	17.53	31	38.6	20	31.40	31	31.4	24	48.56	50	49.9	29
15.8	44.97	45	61.9	8	17.86	33	40.7	21	31.73	33	29.1	23	49.11	55	47.4	25
25.8	45.43	46	63.2	13	18.20	34	42.9	22	32.07	34	26.8	23	49.69	58	45.4	20
35.7	45.89	46	64.9	17	18.54	34	45.1	22	32.41	34	24.6	22	50.29	60	44.0	14
Sec δ, Tan δ	1.509		−1.130		1.000		−0.017		1.018		+0.189		2.217		+1.978	
Mean Place	42ˢ.774		55″.85		15ˢ.130		20″.52		28ˢ.900		53″.42		46ˢ.126		86″.05	
D′ψ α, Dω α	0.00		−0.07		0.00		0.00		0.00		+0.01		−0.01		+0.13	
Dψ δ, Dω δ	−0.4		−0.2		−0.4		−0.2		−0.4		−0.2		−0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**β Crucis.** Mag. 1.5				**31 Comæ.** Mag. 5.1				**32 H. Camelop.** *seq.* Mag. 5.3				**η Centauri.** Mag. 4.3			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	12 42		−59 12		12 47		+28 0		12 48		+83 52		12 48		−39 42	
	s		″		s		″		s		″		s		″	
Jan. 0.8	36.61	56	32.3	18	27.84	37	38.1	19	33.27	217	47.2	6	36.16	41	10.5	20
10.7	37.17	53	34.1	23	28.21	36	36.2	14	35.44	215	46.6	0	36.57	39	12.5	23
20.7	37.70	49	36.4	27	28.57	34	34.8	10	37.59	206	46.6	7	36.96	37	14.8	26
30.7	38.19	44	39.1	30	28.91	30	33.8	6	39.65	188	47.3	13	37.33	33	17.4	27
Feb. 9.6	38.63	38	42.1	32	29.21	27	33.2	1	41.53	164	48.6	18	37.66	29	20.1	28
19.6	39.01	32	45.3	33	29.48	23	33.1	4	43.17	135	50.4	23	37.95	25	22.9	28
Mar. 1.6	39.33	25	48.6	34	29.71	18	33.5	7	44.52	100	52.7	27	38.20	20	25.7	28
11.6	39.58	19	52.0	35	29.89	14	34.2	11	45.52	63	55.4	30	38.40	15	28.5	27
21.5	39.77	12	55.5	34	30.03	9	35.3	14	46.15	25	58.4	31	38.55	11	31.2	25
31.5	39.89	6	58.9	32	30.12	5	36.7	15	46.40	14	61.5	31	38.66	7	33.7	24
Apr. 10.5	39.95	0	62.1	30	30.17	2	38.2	16	46.26	51	64.6	29	38.73	3	36.1	22
20.5	39.95	5	65.1	28	30.19	2	39.8	17	45.75	84	67.5	27	38.76	0	38.3	19
30.4	39.90	10	67.9	25	30.17	4	41.5	16	44.91	114	70.2	24	38.76	4	40.2	16
May 10.4	39.80	15	70.4	21	30.13	7	43.1	16	43.77	140	72.6	19	38.72	6	41.8	13
20.4	39.65	19	72.5	17	30.06	9	44.7	14	42.37	160	74.5	15	38.66	9	43.1	10
30.3	39.46	22	74.2	13	29.97	11	46.1	12	40.77	175	76.0	10	38.57	11	44.1	7
June 9.3	39.24	25	75.5	9	29.86	11	47.3	9	39.02	185	77.0	5	38.46	13	44.8	4
19.3	38.99	27	76.4	4	29.75	12	48.2	6	37.17	190	77.5	1	38.33	14	45.2	0
29.3	38.72	28	76.8	0	29.63	12	48.8	4	35.27	190	77.4	7	38.19	15	45.2	3
July 9.2	38.44	29	76.8	5	29.51	13	49.2	1	33.37	185	76.7	12	38.04	15	44.9	6
19.2	38.15	28	76.3	9	29.38	12	49.3	3	31.52	175	75.5	18	37.89	15	44.3	9
29.2	37.87	27	75.4	14	29.26	11	49.0	5	29.77	162	73.7	22	37.74	15	43.4	12
Aug. 8.2	37.60	24	74.0	18	29.15	10	48.5	8	28.15	145	71.5	26	37.59	13	42.2	15
18.1	37.36	20	72.2	21	29.05	8	47.7	12	26.70	125	68.9	30	37.46	11	40.7	16
28.1	37.16	15	70.1	23	28.97	6	46.5	15	25.45	102	65.9	34	37.35	8	39.1	17
Sept. 7.1	37.01	9	67.8	25	28.91	3	45.0	17	24.43	76	62.5	36	37.27	4	37.4	18
17.0	36.92	1	65.3	25	28.88	1	43.3	20	23.67	47	58.9	38	37.23	0	35.6	18
27.0	36.91	6	62.8	25	28.89	4	41.3	22	23.20	18	55.1	39	37.23	5	33.8	17
Oct. 7.0	36.97	15	60.3	23	28.93	9	39.1	25	23.02	13	51.2	40	37.28	11	32.1	14
17.0	37.12	24	58.0	20	29.02	14	36.6	27	23.15	45	47.2	39	37.39	17	30.7	12
26.9	37.36	31	56.0	17	29.16	19	33.9	28	23.60	77	43.3	37	37.56	23	29.5	8
Nov. 5.9	37.67	39	54.3	13	29.35	23	31.1	28	24.37	109	39.6	35	37.79	28	28.7	4
15.9	38.06	46	53.0	7	29.58	27	28.3	28	25.46	138	36.1	32	38.07	33	28.3	1
25.9	38.52	51	52.3	2	29.85	31	25.5	28	26.84	164	32.9	27	38.40	37	28.4	5
Dec. 5.8	39.03	55	52.1	4	30.16	34	22.7	26	28.48	187	30.2	23	38.77	40	28.9	9
15.8	39.58	56	52.5	9	30.50	36	20.1	24	30.35	203	27.9	17	39.17	41	29.8	14
25.8	40.14	57	53.4	15	30.86	37	17.7	21	32.38	212	26.2	10	39.58	42	31.2	18
35.7	40.71		54.9		31.23		15.6		34.50		25.2		40.00		33.0	
Sec δ, Tan δ	1.954		−1.679		1.133		+0.532		9.382		+9.328		1.300		−0.830	
Mean Place	37ˢ.717		48″.21		27ˢ.711		50″.08		28ˢ.663		68″.80		36ˢ.810		21″.25	
D′ψ α, Dω α	+0.01		−0.11		0.00		+0.03		−0.05		+0.61		0.00		−0.05	
Dψ δ, Dω δ	−0.4		−0.2		−0.4		−0.2		−0.4		−0.2		−0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Ursæ Majoris. Mag. 1.7				δ Virginis. Mag. 3.7				α Can. Ven. *seq.* Mag. 2.9				δ Muscæ. Mag. 3.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 12 50		° ′ +56 25		h m 12 51		° ′ + 3 51		h m 12 51		° ′ +38 46		h m 12 56		° ′ −71 4	
	s		″		s		″		s		″		s		″	
Jan. 0.8	12.97		35.8		13.08		68.1		57.86		61.7		13.89		29.9	
10.7	13.48	51	34.4	14	13.42	34	66.0	21	58.26	40	60.0	17	14.71	82	31.3	14
20.7	13.98	50	33.7	7	13.75	33	64.0	20	58.65	39	58.8	12	15.51	80	33.2	19
30.7	14.46	48	33.6	1	14.06	31	62.2	18	59.02	37	58.1	7	16.26	75	35.6	24
Feb. 9.6	14.90	44	34.1	5	14.34	28	60.7	15	59.36	34	57.9	2	16.93	67	38.4	28
19.6	15.29	39	35.2	11	14.59	25	59.5	12	59.66	30	58.3	4	17.52	59	41.6	32
Mar. 1.6	15.61	32	36.8	16	14.80	21	58.6	9	59.91	25	59.2	9	18.02	50	45.0	34
11.6	15.86	25	38.8	20	14.97	17	58.0	6	60.11	20	60.5	13	18.43	41	48.6	36
21.5	16.04	18	41.1	23	15.10	13	57.7	3	60.26	15	62.1	16	18.73	30	52.2	36
31.5	16.15	11	43.7	26	15.20	10	57.7	0	60.36	10	64.0	19	18.93	20	55.9	37
Apr. 10.5	16.19	4	46.4	27	15.26	6	57.9	2	60.41	5	66.0	20	19.04	11	59.5	36
20.5	16.16	3	49.0	26	15.29	3	58.3	4	60.42	1	68.1	21	19.05	1	62.9	34
30.4	16.07	9	51.6	26	15.30	1	58.8	5	60.39	3	70.2	21	18.97	8	66.2	33
May 10.4	15.94	13	54.0	24	15.28	2	59.4	6	60.32	7	72.2	20	18.80	17	69.2	30
20.4	15.76	18	56.1	21	15.24	4	60.0	6	60.23	9	74.0	18	18.55	25	71.8	26
30.3	15.55	21	57.8	17	15.18	6	60.7	7	60.12	11	75.6	16	18.23	32	74.1	23
June 9.3	15.31	24	59.1	13	15.11	7	61.4	7	59.98	14	76.9	13	17.85	38	75.9	18
19.3	15.05	26	60.0	9	15.03	8	62.1	7	59.83	15	77.9	10	17.41	44	77.2	13
29.3	14.78	27	60.4	4	14.94	9	62.7	6	59.68	15	78.6	7	16.93	48	78.1	9
July 9.2	14.51	27	60.4	0	14.85	9	63.3	6	59.52	16	78.9	3	16.43	50	78.5	4
19.2	14.24	27	59.9	5	14.75	10	63.8	5	59.36	16	78.8	1	15.92	51	78.3	2
29.2	13.98	26	58.9	10	14.65	10	64.2	4	59.21	15	78.3	5	15.41	51	77.6	7
Aug. 8.2	13.75	23	57.4	15	14.56	9	64.4	2	59.07	14	77.4	9	14.92	49	76.4	12
18.1	13.54	21	55.5	19	14.48	8	64.5	1	58.94	13	76.1	13	14.47	45	74.8	16
28.1	13.36	18	53.2	23	14.41	7	64.5	0	58.83	11	74.5	16	14.09	38	72.8	20
Sept. 7.1	13.22	14	50.5	27	14.36	5	64.3	2	58.75	8	72.6	19	13.78	31	70.4	24
17.0	13.12	10	47.5	30	14.34	2	63.9	4	58.70	5	70.3	23	13.57	21	67.8	26
27.0	13.08	4	44.3	32	14.35	1	63.3	6	58.69	1	67.8	25	13.48	9	65.0	28
Oct. 7.0	13.10	2	40.9	34	14.40	5	62.4	9	58.72	3	65.1	27	13.51	3	62.2	28
17.0	13.19	9	37.3	36	14.49	9	61.3	11	58.80	8	62.1	30	13.67	16	59.4	28
26.9	13.34	15	33.6	37	14.62	13	59.9	14	58.94	14	59.0	31	13.96	29	56.9	25
Nov. 5.9	13.56	22	30.0	36	14.80	18	58.3	16	59.13	19	55.8	32	14.38	42	54.7	22
15.9	13.85	29	26.5	35	15.02	22	56.5	18	59.37	24	52.6	32	14.92	54	52.9	18
25.9	14.21	36	23.1	34	15.28	26	54.5	20	59.66	29	49.5	31	15.57	65	51.6	13
Dec. 5.8	14.63	42	20.0	31	15.57	29	52.3	22	59.99	33	46.5	30	16.30	73	50.8	8
15.8	15.09	46	17.3	27	15.89	32	50.0	23	60.35	36	43.8	27	17.09	79	50.6	2
25.8	15.58	49	15.1	22	16.23	34	47.7	23	60.73	38	41.4	24	17.91	82	51.0	4
35.7	16.09	51	13.5	16	16.57	34	45.5	22	61.13	40	39.4	20	18.74	83	52.0	10
Sec δ, Tan δ	1.808		+1.507		1.002		+0.068		1.283		+0.804		3.084		−2.918	
Mean Place	12s.343		54″.77		13s.225		72″.21		57s.614		76″.91		15s.966		47″.27	
D′ψ α, Dω α	−0.01		+0.10		0.00		0.00		0.00		+0.05		+0.02		−0.19	
Dψ δ, Dω δ	−0.4		−0.2		−0.4		−0.2		−0.4		−0.2		−0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**δ Virginis.** Mag. 3.0				**θ Virginis.** Mag. 4.4				**48 Comæ.** Mag. 4.3				**20 Canum Venat.** Mag. 4.7			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 12 57		° ′ +11 25		h m 13 5		° ′ − 5 4		h m 13 7		° ′ +28 18		h m 13 13		° ′ +41 1	
	s		″		s		″		s		″		s		″	
Jan. 0.8	50.66		28.6		26.31		30.6		48.91		55.5		38.77		33.2	
10.7	51.01	35	26.5	21	26.65	34	32.8	22	49.27	36	53.5	20	39.17	40	31.3	19
20.7	51.34	33	24.6	19	26.98	33	34.9	21	49.63	36	51.9	16	39.57	40	30.0	13
30.7	51.65	31	23.0	16	27.30	32	36.9	20	49.97	34	50.8	11	39.96	39	29.2	8
Feb. 9.7	51.94	29	21.8	12	27.59	29	38.7	18	50.29	32	50.2	6	40.32	36	28.9	3
19.6	52.20	26	20.9	9	27.85	26	40.3	16	50.57	28	50.0	2	40.64	32	29.2	3
Mar. 1.6	52.42	22	20.4	5	28.07	22	41.6	13	50.81	24	50.3	3	40.91	27	30.0	8
11.6	52.60	18	20.2	2	28.25	18	42.7	11	51.01	20	51.0	7	41.14	23	31.3	13
21.5	52.74	14	20.4	2	28.40	15	43.5	8	51.17	16	52.1	11	41.32	18	33.0	17
31.5	52.84	10	20.8	4	28.52	12	44.1	6	51.28	11	53.5	14	41.45	13	34.9	19
Apr. 10.5	52.91	7	21.4	6	28.60	8	44.4	3	51.35	7	55.1	16	41.53	8	37.0	21
20.5	52.94	3	22.2	8	28.65	5	44.5	1	51.39	4	56.8	17	41.56	3	39.3	23
30.4	52.95	1	23.2	10	28.67	2	44.5	0	51.39	0	58.6	18	41.55	1	41.6	23
May 10.4	52.93	2	24.2	10	28.66	1	44.3	2	51.36	3	60.4	18	41.50	5	43.8	22
20.4	52.89	4	25.2	10	28.64	2	44.0	3	51.31	5	62.1	17	41.42	8	45.8	20
30.4	52.83	6	26.2	10	28.60	4	43.6	4	51.23	8	63.6	15	41.31	11	47.6	18
June 9.3	52.76	7	27.1	9	28.54	6	43.2	4	51.14	9	64.9	13	41.18	13	49.2	16
19.3	52.68	8	27.9	8	28.47	7	42.7	5	51.03	11	66.0	11	41.03	15	50.4	12
29.3	52.58	10	28.6	7	28.38	9	42.2	5	50.91	12	66.9	9	40.87	16	51.2	8
July 9.2	52.48	10	29.1	5	28.28	10	41.6	6	50.78	13	67.4	5	40.70	17	51.6	4
19.2	52.38	10	29.5	4	28.18	10	41.0	6	50.65	13	67.6	2	40.53	17	51.7	1
29.2	52.28	10	29.8	3	28.08	10	40.5	5	50.52	13	67.5	1	40.35	18	51.3	4
Aug. 8.2	52.18	10	29.9	1	27.99	9	40.0	5	50.39	13	67.1	4	40.18	17	50.5	8
18.1	52.09	9	29.7	2	27.90	9	39.6	4	50.27	12	66.4	7	40.03	15	49.3	12
28.1	52.01	8	29.3	4	27.82	8	39.2	4	50.17	10	65.4	10	39.89	14	47.8	15
Sept. 7.1	51.96	5	28.7	6	27.76	6	39.0	2	50.09	8	64.0	14	39.78	11	45.9	19
17.1	51.93	3	27.9	8	27.73	3	38.9	1	50.03	6	62.3	17	39.70	8	43.6	23
27.0	51.93	0	26.8	11	27.73	0	39.0	1	50.01	2	60.3	20	39.66	4	41.0	26
Oct. 7.0	51.97	4	25.5	13	27.76	3	39.3	3	50.03	2	58.1	22	39.66	0	38.2	28
17.0	52.05	8	23.9	16	27.84	8	39.9	6	50.09	6	55.7	24	39.71	5	35.2	30
26.9	52.18	13	22.1	18	27.96	12	40.7	8	50.20	11	53.1	26	39.81	10	32.0	32
Nov. 5.9	52.35	17	20.1	20	28.13	17	41.8	11	50.36	16	50.3	28	39.97	16	28.7	33
15.9	52.56	21	17.9	22	28.35	22	43.2	14	50.57	21	47.4	29	40.19	22	25.4	33
25.9	52.82	26	15.6	23	28.60	25	44.8	16	50.82	25	44.5	29	40.46	27	22.1	33
Dec. 5.8	53.11	29	13.2	24	28.89	29	46.6	18	51.12	30	41.7	28	40.77	31	19.0	31
15.8	53.43	32	10.8	24	29.21	32	48.6	20	51.45	33	39.0	27	41.12	35	16.1	29
25.8	53.77	34	8.5	23	29.55	34	50.7	21	51.80	35	36.5	25	41.50	38	13.5	26
35.8	54.11	34	6.2	23	29.89	34	52.8	21	52.16	36	34.3	22	41.91	41	11.4	21
Sec δ, Tan δ	1.020		+0.202		1.004		−0.089		1.136		+0.539		1.326		+0.870	
Mean Place	50ˢ.768		35″.54		26ˢ.622		29″.18		48ˢ.908		68″.22		38ˢ.665		49″.62	
D′ψ a, Dω a	0.00		+0.01		0.00		−0.01		0.00		+0.03		−0.01		+0.06	
Dψ δ, Dω δ	−0.4		−0.2		−0.4		−0.3		−0.4		−0.3		−0.4		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**γ Hydræ.** Mag. 3.3				**ι Centauri.** Mag. 2.9				**ζ¹ Ursæ Majoris.** Mag. 2.4				**α Virginis.** Mag. 1.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	13 14		−22 42		13 15		−36 15		13 20		+55 22		13 20		−10 42	
	s		″		s		″		s		″		s		″	
Jan. 0.8	10.75	36	41.6	21	41.24	40	4.6	18	25.81	50	26.4	17	36.00	35	26.8	21
10.7	11.11	36	43.7	21	41.64	39	6.4	21	26.31	50	24.7	11	36.35	34	28.9	21
20.7	11.47	34	45.8	22	42.03	37	8.5	23	26.81	48	23.6	5	36.69	32	31.0	20
30.7	11.81	31	48.0	22	42.40	34	10.8	25	27.29	45	23.1	1	37.01	30	33.0	20
Feb. 9.7	12.12	28	50.2	22	42.74	31	13.3	25	27.74	40	23.2	8	37.31	27	35.0	18
19.6	12.40	24	52.4	21	43.05	27	15.8	26	28.14	35	24.0	13	37.58	24	36.8	16
Mar. 1.6	12.64	20	54.5	19	43.32	22	18.4	25	28.49	29	25.3	18	37.82	20	38.4	13
11.6	12.84	17	56.4	18	43.54	18	20.9	24	28.78	22	27.1	22	38.02	17	39.7	11
21.6	13.01	13	58.2	16	43.72	14	23.3	23	29.00	16	29.3	25	38.19	13	40.8	9
31.5	13.14	10	59.8	14	43.86	11	25.6	22	29.16	9	31.8	27	38.32	10	41.7	7
Apr. 10.5	13.24	6	61.2	12	43.97	7	27.8	20	29.25	2	34.5	27	38.42	6	42.4	5
20.5	13.30	3	62.4	10	44.04	3	29.8	18	29.27	4	37.2	27	38.48	4	42.9	2
30.4	13.33	1	63.4	8	44.07	0	31.6	15	29.23	9	39.9	26	38.52	1	43.1	1
May 10.4	13.34	2	64.2	6	44.07	3	33.1	13	29.14	14	42.5	23	38.53	1	43.2	0
20.4	13.32	4	64.8	4	44.04	5	34.4	10	29.00	18	44.8	20	38.52	3	43.2	1
30.4	13.28	6	65.2	2	43.99	8	35.4	7	28.82	21	46.8	16	38.49	5	43.1	3
June 9.3	13.22	8	65.4	0	43.91	10	36.1	4	28.61	23	48.4	13	38.44	7	42.8	4
19.3	13.14	10	65.4	2	43.81	12	36.5	1	28.38	26	49.7	8	38.37	8	42.4	4
29.3	13.04	10	65.2	4	43.69	14	36.6	1	28.12	27	50.5	3	38.29	10	42.0	5
July 9.3	12.94	11	64.8	5	43.55	14	36.5	4	27.85	27	50.8	2	38.19	10	41.5	5
19.2	12.83	12	64.3	7	43.41	15	36.1	7	27.58	27	50.6	6	38.09	10	41.0	6
29.2	12.71	12	63.6	9	43.26	15	35.4	10	27.31	26	50.0	11	37.99	11	40.4	6
Aug. 8.2	12.59	11	62.7	9	43.11	14	34.4	12	27.05	24	48.9	16	37.88	10	39.8	6
18.1	12.48	9	61.8	10	42.97	12	33.2	14	26.81	22	47.3	20	37.78	9	39.2	5
28.1	12.39	8	60.8	10	42.85	10	31.8	15	26.59	18	45.3	24	37.69	7	38.7	5
Sept. 7.1	12.31	5	59.8	9	42.75	7	30.3	16	26.41	14	42.9	28	37.62	5	38.2	4
17.1	12.26	1	58.9	9	42.68	2	28.7	15	26.27	9	40.1	31	37.57	2	37.8	2
27.0	12.25	3	58.0	7	42.66	2	27.2	14	26.18	4	37.0	33	37.55	2	37.6	0
Oct. 7.0	12.28	8	57.3	5	42.68	8	25.8	13	26.14	3	33.7	35	37.57	7	37.6	2
17.0	12.36	12	56.8	3	42.76	13	24.5	11	26.17	9	30.2	37	37.64	11	37.8	4
27.0	12.48	17	56.5	0	42.89	19	23.4	7	26.26	16	26.5	37	37.75	16	38.2	7
Nov. 5.9	12.65	22	56.5	4	43.08	25	22.7	4	26.42	23	22.8	37	37.91	20	38.9	10
15.9	12.87	27	56.9	7	43.33	30	22.3	0	26.65	30	19.1	35	38.11	25	39.9	13
25.9	13.14	31	57.6	10	43.63	34	22.3	4	26.95	37	15.6	33	38.36	28	41.2	16
Dec. 5.8	13.45	34	58.6	14	43.97	37	22.7	8	27.32	42	12.3	29	38.64	32	42.8	18
15.8	13.79	36	60.0	16	44.34	39	23.5	13	27.74	46	9.4	25	38.96	34	44.6	19
25.8	14.15	36	61.6	19	44.73	40	24.8	16	28.20	48	6.9	21	39.30	34	46.5	20
35.8	14.51		63.5		45.13		26.4		28.68		4.8		39.64		48.5	
Sec δ, Tan δ	1.084		−0.419		1.240		−0.733		1.760		+1.448		1.018		−0.189	
Mean Place	11ˢ.316		45″.99		42ˢ.018		13″.18		25ˢ.561		46″.08		36ˢ.462		26″.80	
D′ψ α, Dω α	0.00		−0.03		+0.01		−0.05		−0.01		+0.09		0.00		−0.01	
Dψ δ, Dω δ	−0.4		−0.3		−0.4		−0.3		−0.4		−0.3		−0.4		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	Groombridge 2001. Mag. 6.1 Right Ascension.		Groombridge 2001. Declination N.		70 Virginis. Mag. 5.2 Right Ascension.		70 Virginis. Declination N.		κ Octantis. Mag. 5.6 Right Ascension.		κ Octantis. Declination S.		ζ Virginis. Mag. 3.4 Right Ascension.		ζ Virginis. Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	13 23		+72 49		13 24		+14 14		13 26		−85 20		13 30		− 0 9	
	s		″		s		″		s		″		s		″	
Jan. 0.8	55.58		72.9		10.25		26.6		28.01		10.4		15.11		9.0	
10.8	56.41	83	71.5	14	10.59	34	24.4	22	31.02	301	11.0	6	15.45	34	11.1	21
20.7	57.26	85	70.7	8	10.93	34	22.5	19	33.98	296	12.2	12	15.78	33	13.1	20
30.7	58.09	83	70.6	1	11.26	33	20.9	16	36.83	285	13.9	17	16.10	32	15.0	19
Feb. 9.7	58.87	78	71.2	6	11.57	31	19.7	12	39.49	266	16.2	23	16.40	30	16.6	16
19.6	59.58	71	72.4	12	11.84	27	18.9	8	41.90	241	18.9	27	16.68	28	18.0	14
Mar. 1.6	60.19	61	74.2	18	12.08	24	18.4	5	44.02	212	22.0	31	16.92	24	19.1	11
11.6	60.69	50	76.5	23	12.28	20	18.3	1	45.80	178	25.4	34	17.13	21	19.9	8
21.6	61.07	38	79.1	26	12.45	17	18.6	3	47.21	141	29.0	36	17.30	17	20.4	5
31.5	61.31	24	82.0	29	12.58	13	19.1	5	48.24	103	32.8	38	17.44	14	20.7	3
Apr. 10.5	61.41	10	85.0	30	12.67	9	19.9	8	48.88	64	36.6	38	17.54	10	20.7	0
20.5	61.38	3	88.0	30	12.73	6	20.9	10	49.11	23	40.4	38	17.61	7	20.5	2
30.5	61.23	15	91.0	30	12.76	3	22.0	11	48.94	17	44.1	37	17.65	4	20.2	3
May 10.4	60.96	27	93.7	27	12.76	0	23.2	12	48.39	55	47.6	35	17.67	2	19.7	5
20.4	60.60	36	96.1	24	12.74	2	24.4	12	47.47	92	50.8	32	17.66	1	19.1	6
30.4	60.15	45	98.2	21	12.70	4	25.6	12	46.20	127	53.7	29	17.63	3	18.5	6
June 9.3	59.63	52	99.8	16	12.64	6	26.7	11	44.60	160	56.3	26	17.58	5	17.9	6
19.3	59.06	57	100.9	11	12.56	8	27.6	9	42.72	188	58.4	21	17.52	6	17.2	7
29.3	58.45	61	101.5	6	12.46	10	28.4	8	40.63	209	60.0	16	17.44	8	16.6	6
July 9.3	57.82	63	101.5	0	12.36	10	29.0	6	38.37	226	61.0	10	17.35	9	16.0	6
19.2	57.19	63	101.0	5	12.25	11	29.5	5	36.02	235	61.5	5	17.25	10	15.5	5
29.2	56.57	62	100.0	10	12.14	11	29.8	3	33.63	239	61.4	1	17.14	11	15.0	5
Aug. 8.2	55.97	60	98.5	15	12.03	11	29.8	0	31.30	233	60.8	6	17.03	11	14.6	4
18.2	55.41	56	96.5	20	11.92	11	29.6	2	29.11	219	59.6	12	16.93	10	14.3	3
28.1	54.91	50	94.0	25	11.82	10	29.1	5	27.13	198	57.9	17	16.84	9	14.2	1
Sept. 7.1	54.47	44	91.2	28	11.74	8	28.4	7	25.44	169	55.8	21	16.76	8	14.2	0
17.1	54.12	35	88.0	32	11.69	5	27.5	9	24.12	132	53.3	25	16.70	6	14.3	1
27.0	53.86	26	84.5	35	11.67	2	26.3	12	23.23	89	50.5	28	16.68	2	14.7	4
Oct. 7.0	53.70	16	80.8	37	11.68	1	24.8	15	22.82	41	47.5	30	16.69	1	15.3	6
17.0	53.66	4	76.9	39	11.73	5	23.1	17	22.91	9	44.5	30	16.74	5	16.1	8
27.0	53.75	9	73.0	39	11.83	10	21.2	19	23.52	61	41.5	30	16.84	10	17.2	11
Nov. 5.9	53.96	21	69.1	39	11.97	14	19.1	21	24.65	113	38.7	28	16.98	14	18.5	13
15.9	54.29	33	65.3	38	12.16	19	16.7	24	26.26	161	36.2	25	17.17	19	20.1	16
25.9	54.75	46	61.7	36	12.39	23	14.2	25	28.30	204	34.1	21	17.40	23	21.9	18
Dec. 5.9	55.33	58	58.4	33	12.66	27	11.7	25	30.70	240	32.5	16	17.67	27	23.8	19
15.8	56.00	67	55.6	28	12.97	31	9.2	25	33.40	270	31.5	10	17.97	30	25.9	21
25.8	56.75	75	53.3	23	13.30	33	6.7	25	36.30	290	31.1	4	18.30	33	28.1	22
35.8	57.56	81	51.5	18	13.64	34	4.4	23	39.30	300	31.2	1	18.63	33	30.3	22
Sec δ, Tan δ	3.389		+3.238		1.031		+0.254		12.318		−12.277		1.000		−0.003	
Mean Place	$54^{s}.818$		$94''.83$		$10^{s}.491$		$35''.39$		$38^{s}.29$*		$27''.65$		$15^{s}.517$		$4''.89$	
D′ψ α, Dω α	−0.03		+0.20		0.00		+0.02		+0.12		−0.76		0.00		0.00	
Dψ δ, Dω δ	−0.4		−0.4		−0.4		−0.4		−0.4		−0.4		−0.4		−0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	17 H. Canum Venat. Mag. 5.0				ε Centauri. Mag. 2.6				m Virginis. Mag. 5.2				τ Boötis. Mag. 4.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	13 30		+37 37		13 34		−53 1		13 37		− 8 15		13 43		+17 52	
	s		″		s		″		s		″		s		″	
Jan. 0.8	54.77	39	24.5	20	20.64	51	16.1	13	2.09	34	53.1	20	7.33	35	73.3	22
10.8	55.16	39	22.5	16	21.15	50	17.4	17	2.43	34	55.1	21	7.68	35	71.1	19
20.7	55.55	38	20.9	11	21.65	48	19.1	21	2.77	33	57.2	20	8.03	33	69.2	16
30.7	55.93	35	19.8	5	22.13	45	21.2	24	3.10	31	59.2	18	8.36	31	67.6	12
Feb. 9.7	56.28	32	19.3	0	22.58	40	23.6	27	3.41	28	61.0	16	8.67	29	66.4	7
19.7	56.60	28	19.3	6	22.98	36	26.3	28	3.69	25	62.6	14	8.96	26	65.7	3
Mar. 1.6	56.88	24	19.9	11	23.34	31	29.1	29	3.94	21	64.0	12	9.22	22	65.4	1
11.6	57.12	19	21.0	14	23.65	26	32.0	30	4.15	18	65.2	10	9.44	18	65.5	4
21.6	57.31	15	22.4	18	23.91	21	35.0	30	4.33	15	66.2	8	9.62	15	65.9	8
31.5	57.46	10	24.2	20	24.12	15	38.0	29	4.48	11	67.0	5	9.77	11	66.7	10
Apr. 10.5	57.56	6	26.2	22	24.27	10	40.9	28	4.59	8	67.5	3	9.88	8	67.7	12
20.5	57.62	1	28.4	22	24.37	6	43.7	26	4.67	5	67.8	1	9.96	4	68.9	14
30.5	57.63	3	30.6	21	24.43	1	46.3	24	4.72	3	67.9	0	10.00	2	70.3	14
May 10.4	57.60	6	32.7	21	24.44	3	48.7	21	4.75	0	67.9	2	10.02	1	71.7	14
20.4	57.54	8	34.8	19	24.41	8	50.8	19	4.75	2	67.7	3	10.01	3	73.1	14
30.4	57.46	11	36.7	16	24.33	11	52.7	15	4.73	4	67.4	4	9.98	6	74.5	13
June 9.4	57.35	13	38.3	13	24.22	15	54.2	11	4.69	6	67.0	4	9.92	8	75.8	11
19.3	57.22	14	39.6	10	24.07	18	55.3	8	4.63	7	66.6	4	9.84	9	76.9	10
29.3	57.08	15	40.6	6	23.89	21	56.1	4	4.56	9	66.2	5	9.75	10	77.9	8
July 9.3	56.93	16	41.2	3	23.68	22	56.5	0	4.47	10	65.7	6	9.65	12	78.7	5
19.2	56.77	17	41.5	1	23.46	23	56.5	5	4.37	11	65.1	5	9.53	12	79.2	3
29.2	56.60	17	41.4	6	23.23	24	56.0	9	4.26	11	64.6	5	9.41	13	79.5	0
Aug. 8.2	56.43	16	40.8	9	22.99	23	55.1	12	4.15	11	64.1	5	9.28	12	79.5	2
18.2	56.27	14	39.9	13	22.76	21	53.9	15	4.04	10	63.6	5	9.16	11	79.3	5
28.1	56.13	12	38.6	17	22.55	17	52.4	18	3.94	8	63.1	4	9.05	10	78.8	8
Sept. 7.1	56.01	9	36.9	20	22.38	13	50.6	20	3.86	6	62.7	2	8.95	8	78.0	10
17.1	55.92	6	34.9	23	22.25	8	48.6	22	3.80	3	62.5	0	8.87	5	77.0	13
27.1	55.86	1	32.6	26	22.17	1	46.4	22	3.77	0	62.5	1	8.82	1	75.7	16
Oct. 7.0	55.85	3	30.0	29	22.16	6	44.2	21	3.77	5	62.6	3	8.81	3	74.1	19
17.0	55.88	8	27.1	31	22.22	13	42.1	20	3.82	9	62.9	6	8.84	8	72.2	21
27.0	55.96	13	24.0	32	22.35	21	40.1	17	3.91	14	63.5	8	8.92	12	70.1	23
Nov. 5.9	56.09	19	20.8	33	22.56	28	38.4	14	4.05	19	64.3	11	9.04	17	67.8	25
15.9	56.28	24	17.5	32	22.84	35	37.0	10	4.24	23	65.4	14	9.21	22	65.3	26
25.9	56.52	29	14.3	31	23.19	41	36.0	5	4.47	27	66.8	16	9.43	26	62.7	27
Dec. 5.9	56.81	33	11.2	30	23.60	45	35.5	0	4.74	31	68.4	18	9.69	29	60.0	26
15.8	57.14	36	8.2	27	24.05	49	35.5	5	5.05	33	70.2	19	9.98	32	57.4	25
25.8	57.50	39	5.5	23	24.54	51	36.0	10	5.38	34	72.1	20	10.30	34	54.9	24
35.8	57.89		3.2		25.05		37.0		5.72		74.1		10.64		52.5	
Sec δ, Tan δ	1.263		+0.771		1.663		−1.328		1.011		−0.145		1.051		+0.323	
Mean Place	54ˢ.845		40″.50		22ˢ.008		28″.29		2ˢ.620		51″.60		7ˢ.667		83″.87	
D′ψ α, Dω α	−0.01		+0.05		+0.01		−0.08		0.00		−0.01		0.00		+0.02	
Dψ δ, Dω δ	−0.4		−0.4		−0.4		−0.4		−0.4		−0.4		−0.4		−0.4	

Mean Solar Date.	**η Ursæ Majoris.** Mag. 1.9				**89 Virginis.** Mag. 5.1				**ζ Centauri.** Mag. 3.1				**η Boötis.** Mag. 2.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	13 44		+49 44		13 45		−17 42		13 50		−46 51		13 50		+18 49	
	s		″		s		″		s		″		s		″	
Jan. 0.8	6.80		30.6		7.79		2.7		5.05		28.2		32.17		49.4	
10.8	7.24	44	28.6	20	8.14	35	4.6	19	5.50	45	29.5	13	32.51	34	47.1	23
20.7	7.68	44	27.1	15	8.49	35	6.6	20	5.96	46	31.1	16	32.86	35	45.2	19
30.7	8.12	44	26.2	9	8.83	34	8.6	20	6.40	44	33.1	20	33.20	34	43.6	16
Feb. 9.7	8.54	42	25.9	3	9.15	32	10.6	20	6.82	42	35.3	22	33.52	32	42.4	12
19.7	8.92	38	26.3	4	9.45	30	12.5	19	7.20	38	37.7	24	33.81	29	41.6	8
Mar. 1.6	9.26	34	27.2	9	9.71	26	14.3	18	7.54	34	40.3	26	34.07	26	41.3	3
11.6	9.55	29	28.7	15	9.94	23	15.9	16	7.84	30	42.9	26	34.30	23	41.4	1
21.6	9.79	24	30.6	19	10.13	19	17.3	14	8.10	26	45.6	27	34.49	19	41.9	5
31.6	9.97	18	32.8	22	10.29	16	18.5	12	8.32	22	48.2	26	34.65	16	42.7	8
Apr. 10.5	10.09	12	35.2	24	10.42	13	19.6	11	8.49	17	50.8	26	34.77	12	43.8	11
20.5	10.15	6	37.8	26	10.51	9	20.5	9	8.61	12	53.3	25	34.86	9	45.1	13
30.5	10.16	1	40.5	27	10.57	6	21.2	7	8.69	8	55.6	23	34.91	5	46.5	14
May 10.4	10.12	4	43.1	26	10.61	4	21.7	5	8.73	4	57.7	21	34.93	2	48.0	15
20.4	10.03	9	45.5	24	10.62	1	22.0	3	8.73	0	59.6	19	34.92	1	49.5	15
30.4	9.91	12	47.7	22	10.61	1	22.2	2	8.69	4	61.2	16	34.89	3	50.9	14
June 9.4	9.76	15	49.6	19	10.57	4	22.2	0	8.62	7	62.6	14	34.84	5	52.2	13
19.3	9.58	18	51.1	15	10.51	6	22.1	1	8.52	10	63.7	11	34.77	7	53.4	12
29.3	9.37	21	52.2	11	10.44	7	21.9	2	8.38	14	64.4	7	34.68	9	54.4	10
July 9.3	9.15	22	52.8	6	10.35	9	21.6	3	8.22	16	64.7	3	34.57	11	55.2	8
19.2	8.92	23	53.0	2	10.24	11	21.2	4	8.04	18	64.7	0	34.45	12	55.8	6
29.2	8.69	23	52.8	2	10.12	12	20.6	6	7.84	20	64.3	4	34.33	12	56.1	3
Aug. 8.2	8.45	24	52.1	7	10.00	12	20.0	6	7.64	20	63.6	7	34.20	13	56.1	0
18.2	8.22	23	50.9	12	9.89	11	19.3	7	7.45	19	62.6	10	34.08	12	55.9	2
28.1	8.01	21	49.3	16	9.78	11	18.6	7	7.27	18	61.3	13	33.96	12	55.4	5
Sept. 7.1	7.83	18	47.3	20	9.68	10	17.9	7	7.11	16	59.7	16	33.86	10	54.6	8
17.1	7.68	15	44.9	24	9.61	7	17.2	7	6.98	13	57.9	18	33.78	8	53.5	11
27.1	7.57	11	42.2	27	9.57	4	16.6	6	6.90	8	56.1	18	33.72	6	52.1	14
Oct. 7.0	7.51	6	39.1	31	9.57	0	16.1	5	6.87	3	54.2	19	33.70	2	50.5	16
17.0	7.50	1	35.8	33	9.61	4	15.9	2	6.91	4	52.4	18	33.72	2	48.6	19
27.0	7.55	5	32.3	35	9.70	9	15.9	0	7.01	10	50.7	17	33.79	7	46.4	22
Nov. 5.9	7.67	12	28.7	36	9.84	14	16.2	3	7.18	17	49.2	15	33.90	11	44.0	24
15.9	7.85	18	25.1	36	10.03	19	16.7	5	7.42	24	48.0	12	34.06	16	41.5	25
25.9	8.10	25	21.5	36	10.26	23	17.5	8	7.72	30	47.2	8	34.27	21	38.9	26
Dec. 5.9	8.41	31	18.1	34	10.54	28	18.6	11	8.08	36	46.9	3	34.53	26	36.2	27
15.8	8.76	35	15.0	31	10.85	31	20.0	14	8.48	40	47.0	1	34.82	29	33.5	27
25.8	9.16	40	12.2	28	11.19	34	21.6	16	8.91	43	47.5	5	35.14	32	30.9	26
35.8	9.59	43	9.8	24	11.54	35	23.4	18	9.37	46	48.4	9	35.47	33	28.5	24
Sec δ, Tan δ	1.547		+1.181		1.050		−0.319		1.463		−1.067		1.057		+0.341	
Mean Place	$6^{s}.869$		49″.70		$8^{s}.470$		4″.08		$6^{s}.321$		38″.05		$32^{s}.541$		60″.44	
D′ψ α, Dω α	−0.01		+0.06		0.00		−0.02		+0.01		−0.06		0.00		+0.02	
Dψ δ, Dω δ	−0.4		−0.4		−0.4		−0.4		−0.4		−0.5		−0.4		−0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Apodis. Var. 5.5–6.6 Right Ascension.		θ Apodis. Declination S.		τ Virginis. Mag. 4.3 Right Ascension.		τ Virginis. Declination N.		11 Boötis. Mag. 6.1 Right Ascension.		11 Boötis. Declination N.		β Centauri. Mag. 0.9 Right Ascension.		β Centauri. Declination S.	
	h m 13 56 s		° ′ −76 22 ″		h m 13 57 s		° ′ + 1 57 ″		h m 13 57 s		° ′ +27 47 ″		h m 13 57 s		° ′ −59 57 ″	
Jan. 0.8	44.57		24.0		12.52		48.9		13.49		69.0		38.49		1.3	
10.8	45.69	112	24.3	3	12.85	33	46.7	22	13.85	36	66.8	22	39.07	58	2.1	8
20.7	46.82	113	25.3	10	13.19	34	44.7	20	14.21	36	64.9	19	39.66	59	3.4	13
30.7	47.92	110	26.8	15	13.52	33	42.9	18	14.56	35	63.4	15	40.24	58	5.1	17
Feb. 9.7	48.97	105	28.7	19	13.83	31	41.3	16	14.90	34	62.4	10	40.78	54	7.2	21
19.7	49.95	98	31.1	24	14.12	29	40.0	13	15.21	31	61.9	5	41.28	50	9.6	24
Mar. 1.6	50.84	89	33.9	28	14.38	26	39.0	10	15.49	28	61.9	0	41.74	46	12.3	27
11.6	51.62	78	37.0	31	14.61	23	38.3	7	15.73	24	62.4	5	42.15	41	15.2	29
21.6	52.28	66	40.3	33	14.80	19	37.9	4	15.93	20	63.3	9	42.49	34	18.2	30
31.6	52.81	53	43.8	35	14.96	16	37.8	1	16.10	17	64.6	13	42.77	28	21.3	31
Apr. 10.5	53.21	40	47.3	35	15.09	13	38.0	2	16.23	13	66.1	15	43.00	23	24.4	31
20.5	53.48	27	50.9	36	15.19	10	38.3	3	16.32	9	67.9	18	43.17	17	27.4	30
30.5	53.62	14	54.4	35	15.26	7	38.8	5	16.37	5	69.8	19	43.27	10	30.3	29
May 10.4	53.62	0	57.7	33	15.30	4	39.4	6	16.39	2	71.7	19	43.31	4	33.1	28
20.4	53.49	13	60.8	31	15.32	2	40.1	7	16.38	1	73.6	19	43.30	1	35.6	25
30.4	53.23	26	63.7	29	15.31	1	40.9	8	16.34	4	75.4	18	43.23	7	37.8	22
June 9.4	52.85	38	66.2	25	15.28	3	41.7	8	16.28	6	77.0	16	43.11	12	39.7	19
19.3	52.37	48	68.3	21	15.23	5	42.5	8	16.19	9	78.4	14	42.94	17	41.3	16
29.3	51.79	58	70.0	17	15.16	7	43.2	7	16.08	11	79.5	11	42.73	21	42.5	12
July 9.3	51.13	66	71.2	12	15.07	9	43.8	6	15.96	12	80.4	9	42.48	25	43.3	8
19.3	50.42	71	71.9	7	14.97	10	44.4	6	15.82	14	81.0	6	42.20	28	43.6	3
29.2	49.68	74	72.0	1	14.86	11	44.9	5	15.68	14	81.3	3	41.90	30	43.5	1
Aug. 8.2	48.93	75	71.6	4	14.74	12	45.3	4	15.53	15	81.2	1	41.59	31	42.9	6
18.2	48.19	74	70.7	9	14.63	11	45.5	2	15.39	14	80.8	4	41.29	30	41.9	10
28.1	47.50	69	69.3	14	14.52	11	45.6	1	15.25	14	80.0	8	41.01	28	40.5	14
Sept. 7.1	46.89	61	67.5	18	14.42	10	45.5	1	15.12	13	78.9	11	40.76	25	38.8	17
17.1	46.39	50	65.2	23	14.35	7	45.2	3	15.02	10	77.4	15	40.56	20	36.8	20
27.1	46.03	36	62.6	26	14.30	5	44.8	4	14.95	7	75.6	18	40.42	14	34.6	22
Oct. 7.0	45.82	21	59.8	28	14.28	2	44.1	7	14.91	4	73.5	21	40.35	7	32.2	24
17.0	45.78	4	57.0	28	14.30	2	43.2	9	14.92	1	71.2	23	40.36	1	29.8	24
27.0	45.92	14	54.2	28	14.37	7	42.0	12	14.97	5	68.6	26	40.47	11	27.5	23
Nov. 6.0	46.26	34	51.5	27	14.49	12	40.6	14	15.07	10	65.8	28	40.67	20	25.4	21
15.9	46.78	52	49.0	25	14.65	16	39.0	16	15.23	16	62.9	29	40.96	29	23.6	18
25.9	47.46	68	46.9	21	14.86	21	37.1	19	15.44	21	59.9	30	41.33	37	22.1	15
Dec. 5.9	48.29	83	45.2	17	15.11	25	35.1	20	15.69	25	56.9	30	41.77	44	21.0	11
15.8	49.24	95	44.0	12	15.40	29	33.0	21	15.98	29	54.0	29	42.27	50	20.5	5
25.8	50.29	105	43.4	6	15.71	31	30.8	22	16.30	32	51.3	27	42.82	55	20.5	0
35.8	51.39	110	43.5	1	16.04	33	28.6	22	16.65	35	48.8	25	43.40	58	21.0	5
Sec δ, Tan δ	4.247		−4.127		1.001		+0.034		1.131		+0.527		1.997		−1.729	
Mean Place	48ˢ.740		38″.74		13ˢ.063		54″.58		13ˢ.843		82″.91		40ˢ.409		13″.57	
D′ψ α, Dω α	+0.05		−0.24		0.00		0.00		−0.01		+0.03		+0.02		−0.10	
Dψ δ, Dω δ	−0.3		−0.5		−0.3		−0.5		−0.3		−0.5		−0.3		−0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**π Hydræ.** Mag. 3.5				**θ Centauri.** Mag. 2.3			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′	
	14 1		−26 15		14 1		−35 56	
	s		″		s		″	
Jan. 0.8	23.91		46.0		32.37		26.3	
10.8	24.28	37	47.7	17	32.77	40	27.7	14
20.8	24.65	37	49.5	18	33.17	40	29.4	17
30.7	25.01	36	51.4	19	33.56	39	31.3	19
Feb. 9.7	25.36	35	53.4	20	33.93	37	33.4	21
19.7	25.68	32	55.4	20	34.27	34	35.6	22
Mar. 1.6	25.97	29	57.4	20	34.58	31	37.9	23
11.6	26.22	25	59.3	19	34.86	28	40.1	22
21.6	26.44	22	61.1	18	35.10	24	42.3	22
31.6	26.62	18	62.7	16	35.30	20	44.4	21
Apr. 10.5	26.77	15	64.2	15	35.46	16	46.4	20
20.5	26.89	12	65.6	14	35.59	13	48.3	19
30.5	26.98	9	66.8	12	35.68	9	50.1	18
May 10.5	27.04	6	67.8	10	35.74	6	51.7	16
20.4	27.06	2	68.6	8	35.76	2	53.0	13
30.4	27.06	0	69.2	6	35.75	1	54.1	11
June 9.4	27.03	3	69.6	4	35.71	4	55.0	9
19.3	26.98	5	69.9	3	35.64	7	55.7	7
29.3	26.90	8	70.0	1	35.55	9	56.1	4
July 9.3	26.80	10	69.9	1	35.43	12	56.3	2
19.3	26.69	11	69.6	3	35.29	14	56.2	1
29.2	26.56	13	69.2	4	35.14	15	55.8	4
Aug. 8.2	26.43	13	68.6	6	34.98	16	55.2	6
18.2	26.30	13	67.8	8	34.82	16	54.3	9
28.2	26.17	13	66.9	9	34.67	15	53.3	10
Sept. 7.1	26.05	12	66.0	9	34.54	13	52.1	12
17.1	25.96	9	65.0	10	34.43	11	50.8	13
27.1	25.90	6	64.1	9	34.36	7	49.4	14
Oct. 7.0	25.88	2	63.2	9	34.33	3	48.1	13
17.0	25.91	3	62.4	8	34.35	2	46.8	13
27.0	25.99	8	61.8	6	34.43	8	45.7	11
Nov. 6.0	26.12	13	61.5	3	34.57	14	44.8	9
15.9	26.30	18	61.5	0	34.77	20	44.2	6
25.9	26.53	23	61.8	3	35.03	26	43.9	3
Dec. 5.9	26.81	28	62.4	6	35.33	30	44.0	1
15.9	27.13	32	63.3	9	35.67	34	44.5	5
25.8	27.48	35	64.5	12	36.04	37	45.3	8
35.8	27.84	36	66.0	15	36.44	40	46.5	12
Sec δ, Tan δ	1.115		−0.494		1.235		−0.725	
Mean Place	$24^{s}.806$		$49''.42$		$33^{s}.440$		$32''.60$	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	+0.01		−0.03		+0.01		−0.04	
$D_\psi\,\delta$, $D_\omega\,\delta$	−0.3		−0.5		−0.3		−0.5	

Mean Solar Date.	**α Draconis.** Mag. 3.6				**d Boötis.** Mag. 4.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′	
	14 2		+64 46		14 6		+25 29	
	s		″		s		″	
Jan. 0.8	1.90		67.4		25.49		58.5	
10.8	2.49	59	65.4	20	25.84	35	56.2	23
20.8	3.10	61	64.0	14	26.19	35	54.2	20
30.7	3.71	61	63.2	8	26.54	35	52.6	16
Feb. 9.7	4.30	59	63.1	1	26.87	33	51.5	11
19.7	4.85	55	63.7	6	27.18	31	50.9	6
Mar. 1.6	5.35	50	64.9	12	27.46	28	50.8	1
11.6	5.78	43	66.7	18	27.71	25	51.2	4
21.6	6.13	35	68.9	22	27.93	22	52.0	8
31.6	6.39	26	71.5	26	28.10	17	53.1	11
Apr. 10.5	6.56	17	74.3	28	28.23	13	54.5	14
20.5	6.65	9	77.3	30	28.33	10	56.1	16
30.5	6.65	0	80.3	30	28.39	6	57.9	18
May 10.5	6.57	8	83.2	29	28.42	3	59.8	19
20.4	6.41	16	85.9	27	28.42	0	61.6	18
30.4	6.19	22	88.3	24	28.40	2	63.4	18
June 9.4	5.91	28	90.4	21	28.35	5	65.0	16
19.3	5.58	33	92.1	17	28.27	8	66.4	14
29.3	5.21	37	93.3	12	28.17	10	67.6	12
July 9.3	4.81	40	94.0	7	28.06	11	68.5	9
19.3	4.39	42	94.2	2	27.93	13	69.2	7
29.2	3.96	43	93.9	3	27.79	14	69.5	3
Aug. 8.2	3.54	42	93.0	9	27.64	15	69.5	0
18.2	3.13	41	91.7	13	27.50	14	69.2	3
28.2	2.74	39	89.9	18	27.36	14	68.6	6
Sept. 7.1	2.39	35	87.6	23	27.23	13	67.6	10
17.1	2.08	31	84.9	27	27.13	10	66.3	13
27.1	1.83	25	81.8	31	27.05	8	64.7	16
Oct. 7.0	1.65	18	78.4	34	27.01	4	62.8	19
17.0	1.55	10	74.8	36	27.01	0	60.6	22
27.0	1.54	1	71.0	38	27.05	4	58.1	25
Nov. 6.0	1.62	8	67.2	38	27.14	9	55.4	27
15.9	1.79	17	63.3	39	27.29	15	52.6	28
25.9	2.05	26	59.5	38	27.48	19	49.7	29
Dec. 5.9	2.40	35	55.9	36	27.72	24	46.7	30
15.9	2.84	44	52.6	33	28.00	28	43.8	29
25.8	3.35	51	49.8	28	28.32	32	41.1	27
35.8	3.91	56	47.4	24	28.66	34	38.6	25
Sec δ, Tan δ	2.348		+2.124		1.108		+0.477	
Mean Place	$2^{s}.056$		$89''.04$		$25^{s}.915$		$71''.88$	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	−0.03		+0.12		−0.01		+0.03	
$D_\psi\,\delta$, $D_\omega\,\delta$	−0.3		−0.5		−0.3		−0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*κ* **Virginis.** Mag. 4.3				**4 Ursæ Minoris.** Mag. 5.0				*ι* **Virginis.** Mag. 4.2				*α* **Boötis.** Mag. 0.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	14 8		− 9 52		14 9		+77 56		14 11		− 5 35		14 11		+19 37	
	s		″		s		″		s		″		s		″	
Jan. 0.8	14.45		11.4		9.93		59.8		26.33		12.5		41.06		53.9	
10.8	14.79	34	13.3	19	10.98	105	58.0	18	26.66	33	14.5	20	41.40	34	51.5	24
20.8	15.13	34	15.2	19	12.09	111	56.8	12	27.00	34	16.5	20	41.74	34	49.4	21
30.7	15.47	34	17.1	19	13.22	113	56.2	6	27.33	33	18.4	19	42.08	34	47.7	17
Feb. 9.7	15.79	32	18.9	18	14.33	111	56.3	1	27.65	32	20.1	17	42.40	32	46.4	13
19.7	16.09	30	20.5	16	15.37	104	57.1	8	27.95	30	21.6	15	42.70	30	45.6	8
Mar. 1.6	16.36	27	21.9	14	16.32	95	58.5	14	28.22	27	22.9	13	42.98	28	45.2	4
11.6	16.60	24	23.1	12	17.14	82	60.4	19	28.46	24	23.9	10	43.22	24	45.2	0
21.6	16.81	21	24.1	10	17.81	67	62.8	24	28.67	21	24.6	7	43.43	21	45.6	4
31.6	16.99	18	24.9	8	18.30	49	65.5	27	28.85	18	25.1	5	43.61	18	46.4	8
Apr. 10.5	17.13	14	25.4	5	18.60	30	68.5	30	29.00	15	25.4	3	43.75	14	47.5	11
20.5	17.24	11	25.7	3	18.72	12	71.6	31	29.11	11	25.5	1	43.85	10	48.8	13
30.5	17.33	9	25.9	2	18.65	7	74.7	31	29.20	9	25.4	1	43.92	7	50.2	14
May 10.5	17.39	6	25.9	0	18.41	24	77.7	30	29.26	6	25.2	2	43.96	4	51.7	15
20.4	17.42	3	25.8	1	18.00	41	80.4	27	29.29	3	24.9	3	43.97	1	53.3	16
30.4	17.42	0	25.6	2	17.44	56	82.8	24	29.30	1	24.5	4	43.95	2	54.9	16
June 9.4	17.40	2	25.3	3	16.76	68	84.9	21	29.28	2	24.0	5	43.91	4	56.3	14
19.3	17.36	4	24.9	4	15.97	79	86.5	16	29.24	4	23.5	5	43.85	6	57.5	12
29.3	17.30	6	24.5	4	15.10	87	87.6	11	29.18	6	23.0	5	43.76	9	58.6	11
July 9.3	17.22	8	24.0	5	14.16	94	88.2	6	29.10	8	22.4	6	43.66	10	59.5	9
19.3	17.12	10	23.5	5	13.18	98	88.3	1	29.00	10	21.9	5	43.54	12	60.1	6
29.2	17.01	11	23.0	5	12.19	99	87.8	5	28.89	11	21.4	5	43.41	13	60.5	4
Aug. 8.2	16.89	12	22.5	5	11.21	98	86.8	10	28.77	12	21.0	4	43.27	14	60.6	1
18.2	16.77	12	22.0	5	10.26	95	85.3	15	28.65	12	20.6	4	43.13	14	60.4	2
28.2	16.66	11	21.6	4	9.36	90	83.3	20	28.53	12	20.3	3	43.00	13	59.9	5
Sept. 7.1	16.56	10	21.2	4	8.53	83	80.8	25	28.43	10	20.1	2	42.88	12	59.1	8
17.1	16.47	9	20.9	3	7.80	73	77.9	29	28.35	8	20.0	1	42.77	11	58.0	11
27.1	16.41	6	20.8	1	7.19	61	74.7	32	28.29	6	20.1	1	42.69	8	56.6	14
Oct. 7.0	16.38	3	20.8	0	6.71	48	71.2	35	28.26	3	20.3	2	42.65	4	55.0	16
17.0	16.40	2	21.0	2	6.38	33	67.5	37	28.27	1	20.8	5	42.64	1	53.1	19
27.0	16.46	6	21.4	4	6.22	16	63.6	39	28.33	6	21.5	7	42.68	4	50.9	22
Nov. 6.0	16.57	11	22.0	6	6.24	2	59.6	40	28.43	10	22.4	9	42.77	9	48.4	25
15.9	16.73	16	22.9	9	6.44	20	55.7	39	28.58	15	23.6	12	42.91	14	45.8	26
25.9	16.94	21	24.1	12	6.82	38	52.0	37	28.78	20	25.0	14	43.10	19	43.1	27
Dec. 5.9	17.19	25	25.5	14	7.38	56	48.5	35	29.03	25	26.6	16	43.33	23	40.3	28
15.9	17.48	29	27.1	16	8.11	73	45.3	32	29.31	28	28.4	18	43.60	27	37.5	28
25.8	17.80	32	28.9	18	8.98	87	42.5	28	29.62	31	30.3	19	43.91	31	34.8	27
35.8	18.13	33	30.8	19	9.97	99	40.3	22	29.95	33	32.3	20	44.24	33	32.3	25
Sec *δ*, Tan *δ*	1.015		−0.174		4.790		+4.685		1.005		−0.098		1.062		+0.357	
Mean Place	15ˢ.168		9″.18		10ˢ.177		82″.56		27ˢ.022		8″.77		41ˢ.559		65″.69	
$D'_\psi a$, $D_\omega a$	0.00		−0.01		−0.07		+0.26		0.00		−0.01		−0.01		+0.02	
$D_\psi \delta$, $D_\omega \delta$	−0.3		−0.5		−0.3		−0.5		−0.3		−0.5		−0.3		−0.5	

[Eph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**λ Boötis.** Mag. 4.3				**λ Virginis.** Mag. 4.6				**2 Libræ.** Mag. 6.3				**θ Boötis.** Mag. 4.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	14 13		+46 28		14 14		−12 58		14 18		−11 19		14 22		+52 14	
	s		″		s		″		s		″		s		″	
Jan. 0.8	4.30		56.0		23.16		17.4		43.79		3.8		13.71		49.2	
10.8	4.71	41	53.6	24	23.51	35	19.3	19	44.13	34	5.7	19	14.15	44	46.8	24
20.8	5.13	42	51.8	18	23.85	34	21.2	19	44.48	35	7.6	19	14.60	45	44.9	19
30.7	5.55	42	50.6	12	24.19	34	23.0	18	44.82	34	9.4	18	15.05	45	43.7	12
Feb. 9.7	5.96	41	49.9	7	24.52	33	24.8	18	45.14	32	11.2	18	15.49	44	43.1	6
19.7	6.34	38	49.9	0	24.82	30	26.5	17	45.44	30	12.8	16	15.91	42	43.1	0
Mar. 1.7	6.68	34	50.5	6	25.10	28	28.0	15	45.72	28	14.2	14	16.30	39	43.7	6
11.6	6.98	30	51.6	11	25.35	25	29.3	13	45.97	25	15.5	13	16.64	34	44.9	12
21.6	7.24	26	53.2	16	25.57	22	30.4	11	46.19	22	16.5	10	16.93	29	46.6	17
31.6	7.45	21	55.2	20	25.75	18	31.3	9	46.38	19	17.3	8	17.16	23	48.8	22
Apr. 10.5	7.61	16	57.5	23	25.90	15	32.0	7	46.54	16	17.9	6	17.34	18	51.3	25
20.5	7.71	10	60.0	25	26.02	12	32.5	5	46.66	12	18.3	4	17.46	12	54.0	27
30.5	7.76	5	62.7	27	26.11	9	32.9	4	46.76	10	18.5	2	17.52	6	56.8	28
May 10.5	7.77	1	65.4	27	26.18	7	33.1	2	46.83	7	18.6	1	17.53	1	59.6	28
20.4	7.73	4	67.9	25	26.22	4	33.1	0	46.87	4	18.5	1	17.48	5	62.3	27
30.4	7.65	8	70.2	23	26.23	1	33.0	1	46.88	1	18.4	1	17.39	9	64.8	25
June 9.4	7.54	11	72.3	21	26.22	1	32.9	1	46.87	1	18.2	2	17.25	14	67.0	22
19.4	7.39	15	74.1	18	26.18	4	32.7	2	46.84	3	17.9	3	17.07	18	68.9	19
29.3	7.22	17	75.5	14	26.12	6	32.4	3	46.78	6	17.5	4	16.86	21	70.4	15
July 9.3	7.02	20	76.5	10	26.04	8	32.0	4	46.70	8	17.1	4	16.63	23	71.5	11
19.3	6.81	21	77.1	6	25.94	10	31.5	5	46.60	10	16.7	4	16.38	25	72.1	6
29.2	6.59	22	77.3	2	25.83	11	31.0	5	46.49	11	16.2	5	16.11	27	72.2	1
Aug. 8.2	6.36	23	77.0	3	25.71	12	30.5	5	46.37	12	15.7	5	15.83	28	71.8	4
18.2	6.13	23	76.2	8	25.58	13	30.0	5	46.25	12	15.2	5	15.56	27	71.0	8
28.2	5.91	22	75.0	12	25.46	12	29.5	5	46.13	12	14.8	4	15.30	26	69.7	13
Sept. 7.1	5.71	20	73.3	17	25.35	11	29.0	5	46.02	11	14.4	4	15.05	25	68.0	17
17.1	5.54	17	71.2	21	25.26	9	28.6	4	45.93	9	14.1	3	14.83	22	65.8	22
27.1	5.40	14	68.8	24	25.20	6	28.3	3	45.86	7	13.9	2	14.65	18	63.2	26
Oct. 7.1	5.30	10	66.0	28	25.17	3	28.2	1	45.82	4	13.8	1	14.52	13	60.3	29
17.0	5.26	4	62.9	31	25.18	1	28.2	0	45.83	1	13.9	1	14.44	8	57.1	32
27.0	5.27	1	59.6	33	25.24	6	28.4	2	45.88	5	14.2	3	14.42	2	53.6	35
Nov. 6.0	5.34	7	56.1	35	25.35	11	28.9	5	45.98	10	14.7	5	14.47	5	50.0	36
15.9	5.47	13	52.6	35	25.51	16	29.6	7	46.13	15	15.5	8	14.59	12	46.3	37
25.9	5.67	20	49.0	36	25.71	20	30.6	10	46.33	20	16.6	11	14.78	19	42.5	38
Dec. 5.9	5.93	26	45.5	35	25.96	25	31.8	12	46.58	25	17.9	13	15.04	26	38.9	36
15.9	6.24	31	42.2	33	26.25	29	33.2	14	46.86	28	19.4	15	15.36	32	35.5	34
25.8	6.60	36	39.2	30	26.56	31	34.8	16	47.17	31	21.1	17	15.73	37	32.4	31
35.8	6.99	39	36.6	26	26.89	33	36.6	18	47.51	34	22.9	18	16.14	41	29.7	27
Sec δ, Tan δ	1.452		+1.053		1.026		−0.230		1.020		−0.200		1.633		+1.291	
Mean Place	4ˢ.673		74″.69		23ˢ.949		16″.02		44ˢ.583		1″.72		14ˢ.156		69″,03	
D′ψ α, Dω α	−0.02		+0.06		0.00		−0.01		0.00		−0.01		−0.02		+0.07	
Dψ δ, Dω δ	−0.3		−0.5		−0.3		−0.6		−0.3		−0.6		−0.3		−0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*f* Boötis. Mag. 5.4				*φ* Virginis. Mag. 5.0				δ Ursæ Minoris. Mag. 4.4				*ρ* Boötis. Mag. 3.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 14 22		° ′ +19 36		h m 14 23		° ′ − 1 50		h m 14 27		° ′ +76 4		h m 14 28		° ′ +30 44	
	s		″		s		″		s		″		s		″	
Jan. 0.8	23.98		51.3		42.38		23.6		40.88		35.6		4.32		55.1	
10.8	24.32	34	48.9	24	42.71	33	25.6	20	41.77	89	33.5	21	4.67	35	52.6	25
20.8	24.66	34	46.8	21	43.05	34	27.6	20	42.72	95	32.0	15	5.02	35	50.6	20
30.7	25.00	34	45.1	17	43.38	33	29.4	18	43.70	98	31.1	9	5.38	36	49.0	16
Feb. 9.7	25.33	33	43.8	13	43.70	32	31.0	16	44.68	98	30.9	2	5.73	35	47.9	11
19.7	25.64	31	43.0	8	44.00	30	32.4	14	45.62	94	31.4	5	6.06	33	47.3	6
Mar. 1.7	25.92	28	42.6	4	44.27	27	33.5	11	46.49	87	32.6	12	6.36	30	47.2	1
11.6	26.17	25	42.6	0	44.52	25	34.4	9	47.26	77	34.3	17	6.63	27	47.7	5
21.6	26.39	22	43.1	5	44.74	22	35.0	6	47.90	64	36.5	22	6.87	24	48.6	9
31.6	26.57	18	43.9	8	44.93	19	35.3	3	48.40	50	39.1	26	7.07	20	49.9	13
Apr. 10.5	26.72	15	45.0	11	45.08	15	35.3	0	48.74	34	42.0	29	7.23	16	51.6	17
20.5	26.84	12	46.4	14	45.20	12	35.1	2	48.92	18	45.1	31	7.35	12	53.5	19
30.5	26.93	9	48.0	16	45.30	10	34.8	3	48.94	2	48.2	31	7.43	8	55.6	21
May 10.5	26.98	5	49.6	16	45.37	7	34.3	5	48.80	14	51.3	31	7.48	5	57.8	22
20.4	27.00	2	51.3	17	45.41	4	33.7	6	48.52	28	54.2	29	7.49	1	59.9	21
30.4	26.99	1	52.9	16	45.42	1	33.1	6	48.11	41	56.8	26	7.47	2	61.9	20
June 9.4	26.96	3	54.4	15	45.41	1	32.4	7	47.58	53	59.1	23	7.42	5	63.8	19
19.4	26.91	5	55.8	14	45.38	3	31.7	7	46.94	64	60.9	18	7.35	7	65.5	17
29.3	26.83	8	57.0	12	45.32	6	31.0	7	46.22	72	62.3	14	7.25	10	66.9	14
July 9.3	26.73	10	58.0	10	45.24	8	30.4	6	45.44	78	63.2	9	7.12	13	68.1	12
19.3	26.61	12	58.7	7	45.15	9	29.8	6	44.61	83	63.6	4	6.98	14	68.9	8
29.2	26.48	13	59.2	5	45.04	11	29.3	5	43.75	86	63.4	2	6.83	15	69.4	5
Aug. 8.2	26.34	14	59.4	2	44.92	12	28.9	4	42.88	87	62.7	7	6.66	17	69.5	1
18.2	26.20	14	59.3	1	44.80	12	28.6	3	42.03	85	61.4	13	6.49	17	69.2	3
28.2	26.06	14	58.9	4	44.68	12	28.4	2	41.22	81	59.6	18	6.33	16	68.5	7
Sept. 7.1	25.93	13	58.3	6	44.57	11	28.3	1	40.46	76	57.4	22	6.18	15	67.5	10
17.1	25.82	11	57.3	10	44.47	10	28.4	1	39.77	69	54.8	26	6.04	14	66.1	14
27.1	25.74	8	56.0	13	44.40	7	28.6	2	39.18	59	51.8	30	5.93	11	64.4	17
Oct. 7.1	25.69	5	54.4	16	44.36	4	29.0	4	38.70	48	48.4	34	5.86	7	62.3	21
17.0	25.67	2	52.6	18	44.36	0	29.6	6	38.34	36	44.8	36	5.82	4	59.9	24
27.0	25.70	3	50.5	21	44.40	4	30.5	9	38.13	21	41.0	38	5.83	1	57.3	26
Nov. 6.0	25.78	8	48.2	23	44.49	9	31.6	11	38.07	6	37.1	39	5.90	7	54.4	29
15.9	25.91	13	45.6	26	44.63	14	33.0	14	38.17	10	33.2	39	6.02	12	51.4	30
25.9	26.09	18	42.9	27	44.82	19	34.6	16	38.44	27	29.4	38	6.19	17	48.3	31
Dec. 5.9	26.31	22	40.2	27	45.05	23	36.4	18	38.87	43	25.8	36	6.41	22	45.2	31
15.9	26.58	27	37.5	27	45.32	27	38.3	19	39.45	58	22.4	34	6.68	27	42.1	31
25.8	26.88	30	34.8	27	45.62	30	40.3	20	40.17	72	19.4	30	6.99	31	39.2	29
35.8	27.20	32	32.3	25	45.94	32	42.3	20	41.00	83	17.0	24	7.32	33	36.5	27
Sec δ, Tan δ	1.062		+0.356		1.001		−0.032		4.156		+4.034		1.164		+0.595	
Mean Place	24ˢ.542		63″.23		43ˢ.102		18″.22		41ˢ.630		58″.15		4ˢ.862		70″.27	
D′ψ α, Dω α	−0.01		+0.02		0.00		0.00		−0.06		+0.22		−0.01		+0.03	
Dψ δ, Dω δ	−0.3		−0.6		−0.3		−0.6		−0.3		−0.6		−0.3		−0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Boötis. Mag. 3.0 Right Ascension.		γ Boötis. Declination N.		η Centauri. Mag. 2.6 Right Ascension.		η Centauri. Declination S.		σ Boötis. Mag. 4.5 Right Ascension.		σ Boötis. Declination N.		α² Centauri. Mag. 0.3 Right Ascension.		α² Centauri. Declination S.	
	h m 14 28 s		° ′ +38 40 ″		h m 14 29 s		° ′ −41 46 ″		h m 14 30 s		° ′ +30 6 ″		h m 14 33 s		° ′ −60 28 ″	
Jan. 0.8	34.01		61.1		57.25		27.9		53.02		66.5		39.34		19.6	
10.8	34.38	37	58.6	25	57.68	43	28.9	10	53.36	34	64.0	25	39.91	57	20.0	4
20.8	34.76	38	56.6	20	58.11	43	30.2	13	53.72	36	61.9	21	40.50	59	20.9	9
30.7	35.14	38	55.1	15	58.53	42	31.7	15	54.08	36	60.3	16	41.09	59	22.2	13
Feb. 9.7	35.51	38	54.1	10	58.94	41	33.5	18	54.43	35	59.2	11	41.66	57	23.9	17
19.7	35.86	35	53.7	4	59.33	39	35.5	20	54.76	33	58.6	6	42.19	53	25.9	20
Mar. 1.7	36.19	33	53.9	2	59.69	36	37.6	21	55.06	30	58.5	1	42.68	49	28.2	23
11.6	36.48	29	54.7	8	60.01	32	39.8	22	55.33	27	58.9	4	43.13	45	30.7	25
21.6	36.73	25	56.0	13	60.30	29	42.0	22	55.57	24	59.8	9	43.52	39	33.5	28
31.6	36.94	21	57.6	16	60.55	25	44.2	22	55.77	20	61.1	13	43.85	33	36.4	29
Apr. 10.6	37.10	16	59.6	20	60.76	21	46.3	21	55.93	16	62.7	16	44.13	28	39.3	29
20.5	37.22	12	61.9	23	60.93	17	48.4	21	56.05	12	64.6	19	44.35	22	42.2	29
30.5	37.30	8	64.3	24	61.07	14	50.4	20	56.14	9	66.6	20	44.50	15	45.0	28
May 10.5	37.34	4	66.7	24	61.17	10	52.2	18	56.19	5	68.7	21	44.59	9	47.7	27
20.4	37.34	0	69.1	24	61.23	6	53.9	17	56.21	2	70.8	21	44.62	3	50.2	25
30.4	37.31	3	71.4	23	61.25	2	55.4	15	56.20	1	72.9	21	44.59	3	52.5	23
June 9.4	37.24	7	73.5	21	61.23	2	56.7	13	56.16	4	74.8	19	44.50	9	54.6	21
19.4	37.14	10	75.3	18	61.18	5	57.7	10	56.08	8	76.5	17	44.36	14	56.4	18
29.3	37.01	13	76.8	15	61.09	9	58.5	8	55.98	10	78.0	15	44.16	20	57.8	14
July 9.3	36.86	15	78.0	12	60.98	11	59.0	5	55.86	12	79.1	11	43.92	24	58.8	10
19.3	36.69	17	78.8	8	60.84	14	59.2	2	55.72	14	79.9	8	43.64	28	59.4	6
29.3	36.50	19	79.2	4	60.67	17	59.1	1	55.57	15	80.4	5	43.33	31	59.6	2
Aug. 8.2	36.31	19	79.2	0	60.49	18	58.7	4	55.41	16	80.5	1	43.00	33	59.3	3
18.2	36.11	20	78.8	4	60.31	18	58.1	6	55.24	17	80.3	2	42.67	33	58.6	7
28.2	35.92	19	77.9	9	60.13	18	57.2	9	55.08	16	79.7	6	42.35	32	57.5	11
Sept. 7.1	35.74	18	76.6	13	59.96	17	56.0	12	54.93	15	78.7	10	42.06	29	56.0	15
17.1	35.58	16	74.9	17	59.81	15	54.6	14	54.79	14	77.4	13	41.80	26	54.2	18
27.1	35.45	13	72.9	20	59.70	11	53.1	15	54.68	11	75.7	17	41.60	20	52.1	21
Oct. 7.1	35.36	9	70.5	24	59.63	7	51.5	16	54.60	8	73.7	20	41.47	13	49.9	22
17.0	35.31	5	67.8	27	59.62	1	50.0	15	54.57	3	71.3	24	41.42	5	47.6	23
27.0	35.31	0	64.8	30	59.67	5	48.6	14	54.58	1	68.7	26	41.46	4	45.2	24
Nov. 6.0	35.37	6	61.6	32	59.78	11	47.3	13	54.64	6	65.9	28	41.60	14	42.9	23
16.0	35.48	11	58.3	33	59.96	18	46.2	11	54.75	11	62.9	30	41.83	23	40.9	20
25.9	35.65	17	54.9	34	60.20	24	45.4	8	54.92	17	59.8	31	42.15	32	39.2	17
Dec. 5.9	35.88	23	51.5	34	60.49	29	45.0	4	55.14	22	56.7	31	42.55	40	37.9	13
15.9	36.16	28	48.3	32	60.84	35	44.9	1	55.41	27	53.6	31	43.02	47	37.0	9
25.8	36.48	32	45.3	30	61.23	39	45.2	3	55.71	30	50.7	29	43.55	53	36.6	4
35.8	36.83	35	42.6	27	61.64	41	45.9	7	56.04	33	48.1	26	44.12	57	36.6	0
Sec δ, Tan δ	1.281		+0.801		1.341		−0.893		1.156		+0.580		2.029		−1.766	
Mean Place	34ˢ.531		78″.22		58ˢ.636		34″.20		53ˢ.583		81″.50		40ˢ.834		36″.81	
D′ψ α, Dω α	−0.01		+0.04		+0.01		−0.05		−0.01		+0.03		+0.03		−0.09	
Dψ δ, Dω δ	−0.3		−0.6		−0.3		−0.6		−0.3		−0.6		−0.3		−0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**33 Boötis.** Mag. 5.4				**α Apodis.** Mag. 3.8				**μ Virginis.** Mag. 4.0				**ε Boötis.** Mag. 2.7			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	14 35		+44 46		14 36		−78 40		14 38		− 5 16		14 41		+27 25	
	s		″		s		″		s		″		s		″	
Jan. 0.8	35.46		27.7		53.93		23.1		27.58		54.5		10.61		71.2	
10.8	35.84	38	25.1	26	55.23	130	22.8	3	27.91	33	56.5	20	10.94	33	68.7	25
20.8	36.24	40	23.1	20	56.58	135	23.1	3	28.25	34	58.4	19	11.29	35	66.6	21
30.7	36.65	41	21.6	15	57.94	136	23.9	8	28.58	33	60.2	18	11.64	35	64.9	17
Feb. 9.7	37.05	40	20.7	9	59.27	133	25.2	13	28.91	33	61.8	16	11.98	34	63.7	12
19.7	37.43	38	20.4	3	60.54	127	27.0	18	29.22	31	63.3	15	12.31	33	62.9	8
Mar. 1.7	37.78	35	20.7	3	61.73	119	29.3	23	29.50	28	64.5	12	12.61	30	62.6	3
11.6	38.10	32	21.6	9	62.82	109	31.9	26	29.76	26	65.4	9	12.89	28	62.9	3
21.6	38.38	28	23.0	14	63.79	97	34.8	29	29.99	23	66.1	7	13.13	24	63.7	8
31.6	38.61	23	24.9	19	64.62	83	38.0	32	30.19	20	66.6	5	13.34	21	64.8	11
Apr. 10.6	38.79	18	27.1	22	65.31	69	41.3	33	30.36	17	66.8	2	13.51	17	66.3	15
20.5	38.92	13	29.5	24	65.84	53	44.7	34	30.50	14	66.8	0	13.64	13	68.1	18
30.5	39.00	8	32.1	26	66.20	36	48.2	35	30.61	11	66.7	1	13.74	10	70.0	19
May 10.5	39.04	4	34.8	27	66.40	20	51.6	34	30.70	9	66.4	3	13.81	7	72.0	20
20.4	39.03	1	37.4	26	66.44	4	54.9	33	30.76	6	66.0	4	13.84	3	74.1	21
30.4	38.98	5	39.8	24	66.31	13	58.0	31	30.79	3	65.5	5	13.84	0	76.1	20
June 9.4	38.90	8	42.1	23	66.02	29	60.8	28	30.79	0	65.0	5	13.81	3	78.0	19
19.4	38.78	12	44.1	20	65.57	45	63.3	25	30.77	2	64.4	6	13.75	6	79.7	17
29.3	38.63	15	45.7	16	64.99	58	65.5	22	30.72	5	63.8	6	13.66	9	81.2	15
July 9.3	38.45	18	47.0	13	64.29	70	67.2	17	30.65	7	63.2	6	13.55	11	82.4	12
19.3	38.25	20	47.8	8	63.49	80	68.4	12	30.56	9	62.7	5	13.42	13	83.3	9
29.3	38.03	22	48.2	4	62.61	88	69.1	7	30.46	10	62.2	5	13.27	15	83.9	6
Aug. 8.2	37.81	22	48.1	1	61.69	92	69.2	1	30.34	12	61.8	4	13.11	16	84.1	2
18.2	37.58	23	47.6	5	60.77	92	68.8	4	30.21	13	61.4	4	12.95	16	84.0	1
28.2	37.35	23	46.7	9	59.87	90	67.9	9	30.08	13	61.1	3	12.79	16	83.5	5
Sept. 7.1	37.14	21	45.3	14	59.03	84	66.5	14	29.96	12	60.9	2	12.63	16	82.7	8
17.1	36.95	19	43.5	18	58.29	74	64.6	19	29.85	11	60.9	0	12.49	14	81.5	12
27.1	36.79	16	41.3	22	57.69	60	62.3	23	29.77	8	61.0	1	12.38	11	80.0	15
Oct. 7.1	36.67	12	38.7	26	57.26	43	59.7	26	29.72	5	61.2	2	12.30	8	78.1	19
17.0	36.60	7	35.8	29	57.02	24	56.9	28	29.71	1	61.6	4	12.26	4	75.9	22
27.0	36.58	2	32.6	32	56.99	3	54.0	29	29.74	3	62.3	7	12.26	0	73.5	24
Nov. 6.0	36.62	4	29.2	34	57.19	20	51.1	29	29.82	8	63.2	9	12.31	5	70.8	27
16.0	36.72	10	25.7	35	57.62	43	48.4	27	29.95	13	64.3	11	12.41	10	67.9	29
25.9	36.88	16	22.1	36	58.26	64	45.9	25	30.12	17	65.7	14	12.57	16	64.9	30
Dec. 5.9	37.11	23	18.6	35	59.10	84	43.7	22	30.34	22	67.2	15	12.78	21	61.9	30
15.9	37.39	28	15.2	34	60.12	102	42.0	17	30.60	26	68.9	17	13.03	25	58.9	30
25.8	37.72	33	12.1	31	61.28	116	40.8	12	30.90	30	70.8	19	13.32	29	56.0	29
35.8	38.08	36	9.3	28	62.54	126	40.1	7	31.22	32	72.7	19	13.65	33	53.3	27
Sec δ, Tan δ	1.409		+0.992		5.094		−4.995		1.004		−0.093		1.127		+0.519	
Mean Place	36ˢ.032		46″.09		59ˢ.789		35″.33		28ˢ.415		49″.77		11ˢ.253		85″.67	
D′ψ α, Dω α	−0.02		+0.05		+0.08		−0.26		0.00		0.00		−0.01		+0.03	
Dψ δ, Dω δ	−0.3		−0.6		−0.3		−0.6		−0.3		−0.6		−0.3		−0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**109 Virginis.** Mag. 3.8				**8 Libræ.** Mag. 5.3				***α* Libræ.** Mag. 2.9				**Groombridge 2164.** Mag. 5.7			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 14 41		° ′ + 2 15		h m 14 45		° ′ −15 38		h m 14 46		° ′ −15 40		h m 14 49		° ′ +59 38	
	s		″		s		″		s		″		s		″	
Jan. 0.8	50.18		25.1		51.33		11.6		2.77		52.8		13.06		29.2	
10.8	50.50	32	23.0	21	51.67	34	13.2	16	3.11	34	54.4	16	13.53	47	26.6	26
20.8	50.83	33	21.0	20	52.01	34	14.9	17	3.46	35	56.1	17	14.03	50	24.6	20
30.8	51.16	33	19.2	18	52.36	35	16.6	17	3.80	34	57.8	17	14.55	52	23.2	14
Feb. 9.7	51.48	32	17.6	16	52.70	34	18.3	17	4.14	34	59.5	17	15.07	52	22.4	8
19.7	51.79	31	16.3	13	53.02	32	19.9	16	4.46	32	61.1	16	15.57	50	22.3	1
Mar. 1.7	52.07	28	15.3	10	53.32	30	21.3	14	4.76	30	62.5	14	16.04	47	22.9	6
11.6	52.33	26	14.7	6	53.59	27	22.6	13	5.03	27	63.8	13	16.46	42	24.1	12
21.6	52.56	23	14.4	3	53.83	24	23.7	11	5.27	24	64.9	11	16.83	37	25.8	17
31.6	52.76	20	14.3	1	54.04	21	24.6	9	5.49	22	65.8	9	17.14	31	28.0	22
Apr. 10.6	52.93	17	14.5	2	54.23	19	25.4	8	5.68	19	66.6	8	17.38	24	30.6	26
20.5	53.08	15	14.9	4	54.39	16	26.0	6	5.84	16	67.2	6	17.55	17	33.4	28
30.5	53.19	11	15.5	6	54.52	13	26.4	4	5.96	12	67.6	4	17.65	10	36.4	30
May 10.5	53.27	8	16.3	8	54.62	10	26.7	3	6.06	10	67.9	3	17.68	3	39.4	30
20.5	53.32	5	17.2	9	54.69	7	26.9	2	6.13	7	68.1	2	17.64	4	42.4	30
30.4	53.35	3	18.1	9	54.73	4	26.9	0	6.17	4	68.2	1	17.53	11	45.2	28
June 9.4	53.35	0	19.0	9	54.74	1	26.9	0	6.18	1	68.1	1	17.37	16	47.7	25
19.4	53.33	2	19.9	9	54.72	2	26.8	1	6.16	2	68.0	1	17.16	21	49.9	22
29.3	53.28	5	20.7	8	54.68	4	26.6	2	6.12	4	67.8	2	16.90	26	51.7	18
July 9.3	53.21	7	21.4	7	54.61	7	26.3	3	6.05	7	67.5	3	16.60	30	53.0	13
19.3	53.12	9	22.1	7	54.52	9	26.0	3	5.96	9	67.2	3	16.27	33	53.9	9
29.3	53.01	11	22.7	6	54.41	11	25.6	4	5.85	11	66.8	4	15.92	35	54.3	4
Aug. 8.2	52.88	13	23.1	4	54.29	12	25.2	4	5.73	12	66.4	4	15.55	37	54.2	1
18.2	52.75	13	23.4	3	54.16	13	24.7	5	5.60	13	66.0	4	15.18	37	53.6	6
28.2	52.62	13	23.5	1	54.02	14	24.2	5	5.46	14	65.5	5	14.82	36	52.5	11
Sept. 7.2	52.50	12	23.4	1	53.89	13	23.7	5	5.33	13	65.0	5	14.47	35	50.9	16
17.1	52.39	11	23.2	2	53.78	11	23.3	4	5.22	11	64.5	5	14.15	32	48.8	21
27.1	52.30	9	22.8	4	53.69	9	22.9	4	5.13	9	64.1	4	13.87	28	46.3	25
Oct. 7.1	52.25	5	22.2	6	53.63	6	22.6	3	5.07	6	63.8	3	13.64	23	43.4	29
17.0	52.23	2	21.4	8	53.61	2	22.5	1	5.05	2	63.7	1	13.47	17	40.2	32
27.0	52.25	2	20.3	11	53.64	3	22.5	0	5.08	3	63.7	0	13.37	10	36.7	35
Nov. 6.0	52.32	7	19.0	13	53.71	7	22.7	2	5.16	8	63.9	2	13.35	2	33.0	37
16.0	52.44	12	17.4	16	53.84	13	23.2	5	5.29	13	64.4	5	13.41	6	29.2	38
25.9	52.61	17	15.6	18	54.02	18	23.9	7	5.47	18	65.1	7	13.56	15	25.4	38
Dec. 5.9	52.82	21	13.6	20	54 25	23	24.8	9	5.69	22	66.0	9	13.79	23	21.6	38
15.9	53.07	25	11.6	20	54.52	27	26.0	12	5.96	27	67.2	12	14.10	31	18.0	36
25.9	53.36	29	9.5	21	54.82	30	27.4	14	6.26	30	68.6	14	14.48	38	14.7	33
35.8	53.67	31	7.4	21	55.14	32	28.9	15	6.59	33	70.1	15	14.91	43	11.9	28
Sec δ, Tan δ	1.001		+0.039		1.038		−0.280		1.039		−0.281		1.979		+1.707	
Mean Place	$50^{s}.962$		32″.29		$52^{s}.308$		9″.69		$3^{s}.753$		50″.89		$13^{s}.843$		50″.03	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	0.00		0.00		0.00		−0.01		0.00		−0.01		−0.03		+0.08	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.3		−0.6		−0.3		−0.7		−0.3		−0.7		−0.3		−0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Ursæ Minoris. Mag. 2.2				ξ² Libræ. Mag. 5.6				Piazzi 221. Mag. 5.8				β Lupi. Mag. 2.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	14 50		+74 30		14 52		−11 3		14 52		+14 47		14 52		−42 46	
	s		″		s		″		s		″		s		″	
Jan. 0.8	55.61		17.5		1.73		36.4		6.01		39.4		47.99		58.3	
10.8	56.38	77	15.1	24	2.06	33	38.1	17	6.33	32	37.0	24	48.41	42	58.9	6
20.8	57.22	84	13.3	18	2.39	33	39.9	18	6.66	33	34.9	21	48.84	43	59.9	10
30.8	58.10	88	12.1	12	2.73	34	41.6	17	6.99	33	33.1	18	49.27	43	61.2	13
Feb. 9.7	58.99	89	11.6	5	3.06	33	43.2	16	7.32	33	31.6	15	49.69	42	62.7	15
19.7	59.86	87	11.8	2	3.38	32	44.7	15	7.63	31	30.5	11	50.10	41	64.4	17
Mar. 1.7	60.68	82	12.6	8	3.68	30	46.0	13	7.92	29	29.9	6	50.48	38	66.3	19
11.6	61.42	74	14.0	14	3.95	27	47.1	11	8.19	27	29.7	2	50.83	35	68.3	20
21.6	62.06	64	16.0	20	4.19	24	48.0	9	8.43	24	29.9	2	51.15	32	70.4	21
31.6	62.58	52	18.5	25	4.41	22	48.7	7	8.64	21	30.4	5	51.43	28	72.5	21
Apr. 10.6	62.96	38	21.3	28	4.60	19	49.2	5	8.82	18	31.3	9	51.68	25	74.6	21
20.5	63.21	25	24.3	30	4.76	16	49.5	3	8.97	15	32.4	11	51.89	21	76.6	20
30.5	63.32	11	27.4	31	4.89	13	49.7	2	9.09	12	33.7	13	52.06	17	78.5	19
May 10.5	63.28	4	30.5	31	4.99	10	49.7	0	9.17	8	35.2	15	52.18	12	80.4	19
20.5	63.11	17	33.5	30	5.06	7	49.6	1	9.22	5	36.8	16	52.27	9	82.1	17
30.4	62.81	30	36.3	28	5.10	4	49.4	2	9.24	2	38.3	15	52.32	5	83.7	16
June 9.4	62.39	42	38.8	25	5.12	2	49.1	3	9.24	0	39.7	14	52.33	1	85.1	14
19.4	61.87	52	40.9	21	5.11	1	48.8	3	9.21	3	41.1	14	52.30	3	86.3	12
29.3	61.27	60	42.6	17	5.07	4	48.4	4	9.16	5	42.4	13	52.23	7	87.2	9
July 9.3	60.60	67	43.9	13	5.01	6	48.0	4	9.08	8	43.5	11	52.13	10	87.9	7
19.3	59.87	73	44.6	7	4.92	9	47.6	4	8.98	10	44.4	9	51.99	14	88.3	4
29.3	59.10	77	44.8	2	4.81	11	47.1	5	8.86	12	45.0	6	51.83	16	88.4	1
Aug. 8.2	58.31	79	44.5	3	4.69	12	46.6	5	8.72	14	45.4	4	51.65	18	88.2	2
18.2	57.52	79	43.6	9	4.56	13	46.2	4	8.58	14	45.6	2	51.46	19	87.7	5
28.2	56.75	77	42.2	14	4.43	13	45.8	4	8.44	14	45.5	1	51.27	19	86.9	8
Sept. 7.2	56.02	73	40.3	19	4.30	13	45.5	3	8.30	14	45.1	4	51.08	19	85.9	10
17.1	55.34	68	38.0	23	4.18	12	45.2	3	8.17	13	44.4	7	50.91	17	84.7	12
27.1	54.74	60	35.2	28	4.09	9	45.0	2	8.07	10	43.5	9	50.78	13	83.3	14
Oct. 7.1	54.23	51	32.1	31	4.03	6	45.0	0	7.99	8	42.3	12	50.69	9	81.8	15
17.0	53.83	40	28.7	34	4.01	2	45.1	1	7.95	4	40.8	15	50.65	4	80.2	16
27.0	53.55	28	25.0	37	4.03	2	45.4	3	7.95	0	39.0	18	50.67	2	78.7	15
Nov. 6.0	53.41	14	21.2	38	4.09	6	45.9	5	8.00	5	37.0	20	50.75	8	77.4	13
16.0	53.42	1	17.3	39	4.21	12	46.6	7	8.10	10	34.7	23	50.90	15	76.2	12
25.9	53.58	16	13.4	39	4.38	17	47.5	9	8.25	15	32.3	24	51.11	21	75.2	10
Dec. 5.9	53.89	31	9.6	38	4.60	22	48.7	12	8.45	20	29.8	25	51.39	28	74.5	7
15.9	54.35	46	6.1	35	4.86	26	50.1	14	8.69	24	27.2	26	51.72	33	74.2	3
25.9	54.94	59	3.0	31	5.15	29	51.6	15	8.97	28	24.6	26	52.09	37	74.3	1
35.8	55.64	70	0.2	28	5.46	31	53.3	17	9.28	31	22.2	24	52.50	41	74.7	4
Sec δ, Tan δ	3.743		+3.608		1.019		−0.196		1.034		+0.264		1.363		−0.926	
Mean Place	56ˢ.879		39″.70		2ˢ.679		32″.91		6ˢ.774		50″.47		49ˢ.527		63″.39	
D′ψ α, Dω α	−0.06		+0.18		0.00		−0.01		0.00		+0.01		+0.02		−0.04	
Dψ δ, Dω δ	−0.3		−0.7		−0.3		−0.7		−0.3		−0.7		−0.3		−0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Libræ. Var. 4.8–6.2				β Boötis. Mag. 3.6				γ Scorpii. Mag. 3.4				ψ Boötis. Mag. 4.7			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	14 56		− 8 10		14 58		+40 43		14 58		−24 56		15 0		+27 16	
	s		″		s		″		s		″		s		″	
Jan. 0.8	18.35		32.0		39.38		42.0		57.33		25.9		42.28		56.3	
10.8	18.67	32	33.8	18	39.74	36	39.3	27	57.68	35	27.1	12	42.61	33	53.7	26
20.8	19.00	33	35.6	18	40.11	37	37.1	22	58.04	36	28.5	14	42.95	34	51.4	23
30.8	19.34	34	37.3	17	40.49	38	35.4	17	58.40	36	30.0	15	43.30	35	49.6	18
Feb. 9.7	19.67	33	38.9	16	40.87	38	34.2	12	58.76	36	31.6	16	43.64	34	48.3	13
19.7	19.98	31	40.4	15	41.24	37	33.6	6	59.10	34	33.2	16	43.97	33	47.4	9
Mar. 1.7	20.27	29	41.6	12	41.59	35	33.6	0	59.42	32	34.8	16	44.28	31	47.0	4
11.7	20.54	27	42.6	10	41.91	32	34.2	6	59.72	30	36.3	15	44.56	28	47.2	2
21.6	20.79	25	43.4	8	42.19	28	35.3	11	59.99	27	37.7	14	44.82	26	47.9	7
31.6	21.01	22	43.9	5	42.43	24	36.9	16	60.23	24	39.0	13	45.04	22	49.0	11
Apr. 10.6	21.20	19	44.2	3	42.63	20	38.9	20	60.44	21	40.2	12	45.23	19	50.4	14
20.5	21.36	16	44.3	1	42.79	16	41.2	23	60.62	18	41.3	11	45.39	16	52.1	17
30.5	21.49	13	44.3	0	42.91	12	43.7	25	60.77	15	42.2	9	45.51	12	54.1	20
May 10.5	21.59	10	44.1	2	42.98	7	46.3	26	60.89	12	43.0	8	45.59	8	56.2	21
20.5	21.67	8	43.8	3	43.01	3	48.9	26	60.98	9	43.7	7	45.64	5	58.3	21
30.4	21.72	5	43.4	4	43.00	1	51.4	25	61.04	6	44.3	6	45.66	2	60.4	21
June 9.4	21.74	2	43.0	4	42.95	5	53.8	24	61.06	2	44.8	5	45.65	1	62.4	20
19.4	21.73	1	42.6	4	42.86	9	55.9	21	61.05	1	45.1	3	45.60	5	64.2	18
29.4	21.69	4	42.1	5	42.74	12	57.7	18	61.01	4	45.3	2	45.52	8	65.8	16
July 9.3	21.63	6	41.6	5	42.59	15	59.1	14	60.94	7	45.4	1	45.42	10	67.2	14
19.3	21.54	9	41.1	5	42.42	17	60.2	11	60.85	9	45.3	1	45.29	13	68.2	10
29.3	21.44	10	40.6	5	42.23	19	60.9	7	60.73	12	45.1	2	45.15	14	68.9	7
Aug. 8.2	21.32	12	40.2	4	42.02	21	61.2	3	60.60	13	44.8	3	44.99	16	69.3	4
18.2	21.19	13	39.8	4	41.80	22	61.0	2	60.46	14	44.3	5	44.82	17	69.4	1
28.2	21.06	13	39.5	3	41.59	21	60.4	6	60.31	15	43.7	6	44.65	17	69.1	3
Sept. 7.2	20.93	13	39.2	3	41.38	21	59.3	11	60.16	15	43.0	7	44.48	17	68.4	7
17.1	20.81	12	39.0	2	41.18	20	57.8	15	60.03	13	42.3	7	44.33	15	67.3	11
27.1	20.71	10	38.9	1	41.01	17	55.9	19	59.92	11	41.6	7	44.20	13	65.9	14
Oct. 7.1	20.65	6	39.0	1	40.88	13	53.6	23	59.85	7	40.9	7	44.10	10	64.2	17
17.1	20.62	3	39.3	3	40.79	9	51.0	26	59.82	3	40.3	6	44.03	7	62.1	21
27.0	20.63	1	39.7	4	40.74	5	48.1	29	59.83	1	39.7	6	44.01	2	59.7	24
Nov. 6.0	20.69	6	40.4	7	40.75	1	44.9	32	59.90	7	39.3	4	44.04	3	57.1	26
16.0	20.80	11	41.3	9	40.83	8	41.6	33	60.02	12	39.2	1	44.12	8	54.3	28
25.9	20.97	17	42.4	11	40.96	13	38.2	34	60.20	18	39.3	1	44.26	14	51.3	30
Dec. 5.9	21.18	21	43.7	13	41.15	19	34.7	35	60.43	23	39.6	3	44.45	19	48.3	30
15.9	21.43	25	45.2	15	41.40	25	31.3	34	60.70	27	40.2	6	44.68	23	45.3	30
25.9	21.71	28	46.9	17	41.69	29	28.1	32	61.01	31	41.0	8	44.95	27	42.4	29
35.8	22.02	31	48.6	17	42.02	33	25.2	29	61.35	34	42.1	11	45.26	31	39.6	28
Sec δ, Tan δ	1.010		−0.144		1.320		+0.861		1.103		−0.465		1.125		+0.516	
Mean Place	19ˢ.288		27″.50		40ˢ.142		59″.62		58ˢ.493		26″.08		43ˢ.053		70″.78	
D′ψ α, Dω α	0.00		−0.01		−0.02		+0.04		+0.01		−0.02		−0.01		+0.02	
Dψ δ, Dω δ	−0.3		−0.7		−0.3		−0.7		−0.3		−0.7		−0.3		−0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*c* **Boötis.** Mag. 5.0				ζ **Lupi.** Mag. 3.5				*ι* **Libræ.** Mag. 4.7				*γ* **Triang. Aust.** Mag. 3.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	15 3		+25 11		15 5		−51 46		15 7		−19 27		15 10		−68 21	
	s		″		s		″		s		″		s		″	
Jan. 0.9	28.00		72.6		59.69		1.0		14.41		49.3		42.73		24.5	
10.8	28.32	32	70.1	25	60.17	48	1.2	2	14.75	34	50.7	14	43.45	72	24.1	4
20.8	28.66	34	67.8	23	60.66	49	1.8	6	15.10	35	52.1	14	44.21	76	24.1	0
30.8	29.00	34	65.9	19	61.16	50	2.7	9	15.45	35	53.6	15	44.99	78	24.6	5
Feb. 9.7	29.34	34	64.5	14	61.65	49	4.0	13	15.79	34	55.2	16	45.76	77	25.6	10
19.7	29.66	32	63.6	9	62.12	47	5.6	16	16.12	33	56.7	15	46.51	75	27.0	14
Mar. 1.7	29.97	31	63.2	4	62.57	45	7.4	18	16.44	32	58.1	14	47.23	72	28.8	18
11.7	30.26	29	63.3	1	62.99	42	9.4	20	16.73	29	59.4	13	47.90	67	30.9	21
21.6	30.52	26	63.9	6	63.37	38	11.6	22	17.00	27	60.6	12	48.52	62	33.3	24
31.6	30.74	22	64.9	10	63.72	35	13.9	23	17.24	24	61.6	10	49.07	55	35.9	26
Apr. 10.6	30.93	19	66.2	13	64.02	30	16.2	23	17.45	21	62.5	9	49.55	48	38.7	28
20.6	31.09	16	67.8	16	64.28	26	18.6	24	17.63	18	63.2	7	49.96	41	41.6	29
30.5	31.21	12	69.7	19	64.49	21	20.9	23	17.78	15	63.8	6	50.29	33	44.6	30
May 10.5	31.30	9	71.7	20	64.65	16	23.2	23	17.90	12	64.3	5	50.53	24	47.6	30
20.5	31.36	6	73.8	21	64.77	12	25.4	22	18.00	10	64.6	3	50.68	15	50.5	29
30.4	31.38	2	75.8	20	64.84	7	27.4	20	18.06	6	64.8	2	50.75	7	53.3	28
June 9.4	31.37	1	77.7	19	64.85	1	29.2	18	18.09	3	64.9	1	50.73	2	55.9	26
19.4	31.33	4	79.5	18	64.82	3	30.8	16	18.09	0	65.0	1	50.62	11	58.3	24
29.4	31.26	7	81.1	16	64.74	8	32.2	14	18.06	3	65.0	0	50.42	20	60.4	21
July 9.3	31.17	9	82.4	13	64.62	12	33.3	11	18.00	6	64.9	1	50.15	27	62.1	17
19.3	31.05	12	83.4	10	64.45	17	34.1	8	17.92	8	64.7	2	49.81	34	63.4	13
29.3	30.91	14	84.1	7	64.25	20	34.5	4	17.82	10	64.4	3	49.42	39	64.2	8
Aug. 8.3	30.76	15	84.5	4	64.02	23	34.6	1	17.69	13	64.1	3	48.99	43	64.6	4
18.2	30.60	16	84.6	1	63.78	24	34.3	3	17.55	14	63.7	4	48.54	45	64.5	1
28.2	30.43	17	84.4	2	63.54	24	33.6	7	17.41	14	63.2	5	48.08	46	63.9	6
Sept. 7.2	30.27	16	83.8	6	63.30	24	32.6	10	17.27	14	62.7	5	47.63	45	62.9	10
17.1	30.12	15	82.8	10	63.08	22	31.3	13	17.14	13	62.2	5	47.22	41	61.4	15
27.1	29.99	13	81.5	13	62.90	18	29.8	15	17.03	11	61.7	5	46.87	35	59.6	18
Oct. 7.1	29.89	10	79.9	16	62.76	14	28.0	18	16.95	8	61.2	5	46.60	27	57.4	22
17.1	29.83	6	77.9	20	62.68	8	26.1	19	16.91	4	60.8	4	46.42	18	55.0	24
27.0	29.81	2	75.6	23	62.68	0	24.2	19	16.92	1	60.6	2	46.36	6	52.4	26
Nov. 6.0	29.84	3	73.1	25	62.75	7	22.3	19	16.98	6	60.6	0	46.42	6	49.8	26
16.0	29.92	8	70.4	27	62.90	15	20.6	17	17.09	11	60.8	2	46.60	18	47.3	25
25.9	30.05	13	67.5	29	63.12	22	19.1	15	17.25	16	61.2	4	46.91	31	45.0	23
Dec. 5.9	30.24	19	64.6	29	63.42	30	17.8	13	17.46	21	61.8	6	47.34	43	43.0	20
15.9	30.47	23	61.6	30	63.78	36	16.9	9	17.71	25	62.6	8	47.87	53	41.3	17
25.9	30.74	27	58.7	29	64.19	41	16.4	5	18.01	30	63.7	11	48.49	62	40.0	13
35.8	31.04	30	56.0	27	64.65	46	16.3	1	18.34	33	65.0	13	49.18	69	39.2	8
Sec δ, Tan δ	1.105		+0.471		1.616		−1.270		1.061		−0.353		2.712		−2.521	
Mean Place	28ˢ.787		86″.64		61ˢ.652		7″.22		15ˢ.536		47″.52		46ˢ.150		33″.08	
D′ψ α, Dω α	−0.01		+0.02		+0.02		−0.06		+0.01		−0.02		+0.05		−0.11	
Dψ δ, Dω δ	−0.3		−0.7		−0.3		−0.7		−0.3		−0.7		−0.3		−0.7	

Mean Solar Date.	3 Serpentis. Mag. 5.4				δ Boötis. Mag. 3.5				β Libræ. Mag. 2.7				γ Ursæ Minoris. Mag. 3.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 15 10		° ′ + 5 15		h m 15 11		° ′ +33 37		h m 15 12		° ′ − 9 3		h m 15 20		° ′ +72 8	
	s		″		s		″		s		″		s		″	
Jan. 0.9	50.88		33.5		58.89		63.7		18.37		49.9		49.77		15.4	
10.8	51.19	31	31.4	21	59.21	32	61.0	27	18.69	32	51.6	17	50.39	62	12.6	28
20.8	51.51	32	29.4	20	59.56	35	58.7	23	19.02	33	53.3	17	51.09	70	10.4	22
30.8	51.84	33	27.6	18	59.92	36	56.8	19	19.35	33	55.0	17	51.84	75	8.8	16
Feb. 9.7	52.16	32	26.0	16	60.27	35	55.4	14	19.68	33	56.6	16	52.62	78	7.9	9
19.7	52.47	31	24.7	13	60.62	35	54.6	8	20.00	32	58.0	14	53.39	77	7.6	3
Mar. 1.7	52.77	30	23.8	9	60.95	33	54.3	3	20.30	30	59.2	12	54.14	75	8.0	4
11.7	53.04	27	23.3	5	61.26	31	54.6	3	20.58	28	60.2	10	54.84	70	9.1	11
21.6	53.29	25	23.1	2	61.54	28	55.4	8	20.84	26	60.9	7	55.46	62	10.8	17
31.6	53.51	22	23.2	1	61.78	24	56.7	13	21.07	23	61.4	5	55.99	53	13.0	22
Apr. 10.6	53.71	20	23.6	4	61.98	20	58.4	17	21.28	21	61.7	3	56.41	42	15.5	25
20.6	53.88	17	24.3	7	62.15	17	60.4	20	21.46	18	61.8	1	56.72	31	18.4	29
30.5	54.02	14	25.1	8	62.28	13	62.6	22	21.61	15	61.8	0	56.91	19	21.5	31
May 10.5	54.13	11	26.1	10	62.37	9	65.0	24	21.73	12	61.7	1	56.98	7	24.7	32
20.5	54.21	8	27.2	11	62.43	6	67.4	24	21.82	9	61.4	3	56.93	5	27.8	31
30.4	54.26	5	28.4	12	62.45	2	69.8	24	21.88	6	61.0	4	56.76	17	30.8	30
June 9.4	54.28	2	29.5	11	62.43	2	72.1	23	21.91	3	60.6	4	56.48	28	33.6	28
19.4	54.27	1	30.6	11	62.38	5	74.1	20	21.91	0	60.2	4	56.10	38	36.1	25
29.4	54.23	4	31.6	10	62.29	9	75.9	18	21.88	3	59.7	5	55.64	46	38.2	21
July 9.3	54.17	6	32.5	9	62.18	11	77.4	15	21.83	5	59.2	5	55.10	54	39.8	16
19.3	54.09	8	33.3	8	62.04	14	78.6	12	21.75	8	58.7	5	54.50	60	41.0	12
29.3	53.99	10	34.0	7	61.88	16	79.4	8	21.65	10	58.3	4	53.85	65	41.7	7
Aug. 8.3	53.86	13	34.5	5	61.70	18	79.9	5	21.53	12	57.9	4	53.17	68	41.8	1
18.2	53.72	14	34.8	3	61.51	19	80.0	1	21.40	13	57.5	4	52.47	70	41.4	4
28.2	53.58	14	34.9	1	61.31	20	79.6	4	21.26	14	57.2	3	51.77	70	40.5	9
Sept. 7.2	53.44	14	34.9	0	61.12	19	78.8	8	21.13	13	56.9	3	51.09	68	39.1	14
17.1	53.31	13	34.6	3	60.94	18	77.6	12	21.00	13	56.7	2	50.44	65	37.2	19
27.1	53.20	11	34.1	5	60.79	15	76.1	15	20.89	11	56.6	1	49.85	59	34.8	24
Oct. 7.1	53.12	8	33.4	7	60.66	13	74.2	19	20.81	8	56.6	0	49.33	52	32.0	28
17.1	53.08	4	32.5	9	60.57	9	71.9	23	20.77	4	56.8	2	48.90	43	28.9	31
27.0	53.07	1	31.3	12	60.53	4	69.3	26	20.77	0	57.2	4	48.57	33	25.5	34
Nov. 6.0	53.10	3	29.8	15	60.54	1	66.5	28	20.81	4	57.8	6	48.36	21	21.8	37
16.0	53.19	9	28.1	17	60.60	6	63.4	31	20.91	10	58.6	8	48.28	8	17.9	39
26.0	53.33	14	26.3	18	60.72	12	60.2	32	21.06	15	59.6	10	48.34	6	14.0	39
Dec. 5.9	53.52	19	24.3	20	60.89	17	56.9	33	21.26	20	60.8	12	48.53	19	10.2	38
15.9	53.75	23	22.2	21	61.12	23	53.7	32	21.50	24	62.2	14	48.85	32	6.6	36
25.9	54.01	26	20.0	22	61.39	27	50.6	31	21.77	27	63.8	16	49.29	44	3.2	34
35.8	54.31	30	17.8	22	61.69	30	47.7	29	22.07	30	65.4	16	49.85	56	0.1	31
Sec δ, Tan δ	1.004		+0.092		1.201		+0.665		1.013		−0.160		3.260		+3.103	
Mean Place	$51^{s}.787$		42″.34		$59^{s}.729$		79″.72		$19^{s}.394$		45″.09		$51^{s}.522$		36″.75	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	0.00		0.00		−0.01		+0.03		0.00		−0.01		−0.06		+0.13	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.3		−0.7		−0.3		−0.7		−0.3		−0.7		−0.3		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ Boötis pr. Mag. 4.5				τ¹ Serpentis. Mag. 5.5				ι Draconis. Mag. 3.5				ρ Octantis. Mag. 5.7			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	15 21		+37 40		15 21		+15 43		15 22		+59 15		15 22		−84 10	
	s		″		s		″		s		″		s		″	
Jan. 0.9	11.31		37.6		44.29		48.1		58.47		53.5		50.47		31.1	
10.8	11.64	33	34.8	28	44.59	30	45.7	24	58.89	42	50.6	29	52.77	230	30.0	11
20.8	11.99	35	32.4	24	44.91	32	43.5	22	59.36	47	48.2	24	55.23	246	29.4	6
30.8	12.36	37	30.4	20	45.24	33	41.6	19	59.86	50	46.4	18	57.79	256	29.4	0
Feb. 9.8	12.73	37	29.0	14	45.57	33	40.1	15	60.37	51	45.2	12	60.39	260	29.9	5
19.7	13.09	36	28.2	8	45.89	32	39.0	11	60.87	50	44.7	5	62.96	257	30.9	10
Mar. 1.7	13.43	34	28.0	2	46.19	30	38.3	7	61.35	48	44.9	2	65.44	248	32.4	15
11.7	13.75	32	28.4	4	46.47	28	38.0	3	61.80	45	45.7	8	67.78	234	34.4	20
21.6	14.04	29	29.3	9	46.73	26	38.2	2	62.21	41	47.1	14	69.95	217	36.8	24
31.6	14.30	26	30.7	14	46.96	23	38.8	6	62.56	35	49.1	20	71.90	195	39.4	26
Apr. 10.6	14.52	22	32.5	18	47.16	20	39.7	9	62.85	29	51.5	24	73.60	170	42.4	30
20.6	14.70	18	34.6	21	47.34	18	40.9	12	63.07	22	54.2	27	75.01	141	45.6	32
30.5	14.84	14	37.0	24	47.49	15	42.3	14	63.23	16	57.2	30	76.12	111	48.9	33
May 10.5	14.94	10	39.5	25	47.60	11	43.9	16	63.32	9	60.3	31	76.91	79	52.3	34
20.5	15.00	6	42.1	26	47.68	8	45.5	16	63.34	2	63.3	30	77.36	45	55.7	34
30.5	15.02	2	44.6	25	47.73	5	47.2	17	63.29	5	66.3	30	77.47	11	59.0	33
June 9.4	15.00	2	47.0	24	47.75	2	48.8	16	63.18	11	69.1	28	77.24	23	62.2	32
19.4	14.94	6	49.2	22	47.74	1	50.4	16	63.01	17	71.6	25	76.67	57	65.2	30
29.4	14.85	9	51.2	20	47.70	4	51.8	14	62.79	22	73.8	22	75.78	89	67.8	26
July 9.3	14.73	12	52.9	17	47.63	7	53.1	13	62.52	27	75.6	18	74.61	117	70.1	23
19.3	14.58	15	54.2	13	47.54	9	54.1	10	62.21	31	76.9	13	73.19	142	71.9	18
29.3	14.40	18	55.1	9	47.42	12	54.9	8	61.87	34	77.7	8	71.56	163	73.3	14
Aug. 8.3	14.20	20	55.6	5	47.28	14	55.5	6	61.50	37	78.1	4	69.79	177	74.1	8
18.2	13.99	21	55.7	1	47.13	15	55.8	3	61.12	38	78.0	1	67.92	187	74.4	3
28.2	13.78	21	55.4	3	46.98	15	55.8	0	60.74	38	77.3	7	66.04	188	74.1	3
Sept. 7.2	13.57	21	54.7	7	46.83	15	55.5	3	60.36	38	76.1	12	64.21	183	73.3	8
17.2	13.37	20	53.5	12	46.68	15	55.0	5	60.00	36	74.4	17	62.50	171	71.9	14
27.1	13.19	18	51.9	16	46.55	13	54.2	8	59.67	33	72.3	21	61.01	149	70.0	19
Oct. 7.1	13.04	15	49.9	20	46.45	10	53.0	12	59.39	28	69.7	26	59.77	124	67.6	24
17.1	12.93	11	47.5	24	46.39	6	51.5	15	59.16	23	66.8	29	58.87	90	64.9	27
27.0	12.86	7	44.8	27	46.36	3	49.8	17	59.00	16	63.5	33	58.36	51	62.1	28
Nov. 6.0	12.85	1	41.9	29	46.38	2	47.8	20	58.91	9	59.9	36	58.25	11	59.1	30
16.0	12.90	5	38.7	32	46.45	7	45.6	22	58.90	1	56.2	37	58.58	33	56.0	31
26.0	13.00	10	35.4	33	46.57	12	43.2	24	58.98	8	52.4	38	59.35	77	53.1	29
Dec. 5.9	13.16	16	32.0	34	46.74	17	40.7	25	59.14	16	48.6	38	60.53	118	50.4	27
15.9	13.38	22	28.6	34	46.95	21	38.1	26	59.39	25	44.9	37	62.08	155	48.0	24
25.9	13.65	27	25.4	32	47.20	25	35.5	26	59.71	32	41.4	35	63.97	189	46.1	19
35.9	13.95	30	22.4	30	47.49	29	33.0	25	60.10	39	38.3	31	66.13	216	44.6	15
Sec δ, Tan δ	1.263		+0.772		1.039		+0.282		1.957		+1.682		9.864		−9.813	
Mean Place	12ˢ.230		54″.38		45ˢ.203		59″.90		59ˢ.659		73″.66		63ˢ.25*		40″.11	
D′ψ α, Dω α	−0.02		+0.03		−0.01		+0.01		−0.03		+0.07		+0.20		−0.41	
Dψ δ, Dω δ	−0.3		−0.8		−0.3		−0.8		−0.3		−0.8		−0.3		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Libræ. Mag. 5.6				β Coronæ Borealis. Mag. 3.7				ν^1 Boötis. Mag. 5.2				γ Lupi (*mean*). Mag. 3.0			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 15 23		° ′ −16 24		h m 15 24		° ′ +29 23		h m 15 27		° ′ +41 7		h m 15 29		° ′ −40 52	
	s		″		s		″		s		″		s		″	
Jan. 0.9	19.69		53.2		13.61		63.2		47.28		27.5		18.63		28.5	
10.8	20.01	32	54.6	14	13.92	31	60.5	27	47.61	33	24.6	29	19.02	39	28.8	3
20.8	20.35	34	56.0	14	14.25	33	58.1	24	47.97	36	22.1	25	19.43	41	29.5	7
30.8	20.69	34	57.5	15	14.59	34	56.1	20	48.34	37	20.1	20	19.85	42	30.4	9
Feb. 9.8	21.03	34	59.0	15	14.94	35	54.6	15	48.72	38	18.7	14	20.27	42	31.5	11
19.7	21.36	33	60.4	14	15.28	34	53.6	10	49.09	37	17.9	8	20.68	41	32.8	13
Mar. 1.7	21.68	32	61.7	13	15.60	32	53.2	4	49.45	36	17.7	2	21.07	39	34.3	15
11.7	21.98	30	62.8	11	15.90	30	53.3	1	49.79	34	18.1	4	21.44	37	35.9	16
21.6	22.25	27	63.8	10	16.18	28	54.0	7	50.10	31	19.0	9	21.78	34	37.6	17
31.6	22.50	25	64.6	8	16.43	25	55.1	11	50.37	27	20.4	14	22.10	32	39.3	17
Apr. 10.6	22.72	22	65.2	6	16.64	21	56.6	15	50.60	23	22.3	19	22.38	28	41.0	17
20.6	22.91	19	65.7	5	16.82	18	58.4	18	50.79	19	24.6	23	22.63	25	42.7	17
30.5	23.07	16	66.1	4	16.96	14	60.4	20	50.94	15	27.1	25	22.84	21	44.4	17
May 10.5	23.21	14	66.3	2	17.07	11	62.6	22	51.05	11	29.7	26	23.02	18	46.0	16
20.5	23.32	11	66.4	1	17.14	7	64.9	23	51.11	6	32.4	27	23.16	14	47.6	16
30.5	23.40	8	66.4	0	17.18	4	67.2	23	51.13	2	35.1	27	23.26	10	49.0	14
June 9.4	23.45	5	66.4	0	17.18	0	69.4	22	51.11	2	37.7	26	23.31	5	50.3	13
19.4	23.46	1	66.3	1	17.15	3	71.4	20	51.05	6	40.0	23	23.32	1	51.5	12
29.4	23.44	2	66.2	1	17.08	7	73.2	18	50.95	10	42.1	21	23.29	3	52.5	10
July 9.3	23.39	5	66.0	2	16.98	10	74.8	16	50.81	14	43.8	17	23.22	7	53.3	8
19.3	23.32	7	65.8	2	16.86	12	76.1	13	50.65	16	45.2	14	23.12	10	53.9	6
29.3	23.22	10	65.5	3	16.71	15	77.0	9	50.46	19	46.2	10	22.98	14	54.2	3
Aug. 8.3	23.10	12	65.2	3	16.55	16	77.6	6	50.25	21	46.8	6	22.82	16	54.3	1
18.2	22.96	14	64.8	4	16.37	18	77.8	2	50.02	23	46.9	1	22.64	18	54.1	2
28.2	22.81	15	64.4	4	16.18	19	77.6	2	49.79	23	46.6	3	22.44	20	53.7	4
Sept. 7.2	22.67	14	64.0	4	16.00	18	77.0	6	49.56	23	45.8	8	22.24	20	53.0	7
17.2	22.54	13	63.6	4	15.83	17	76.1	9	49.34	22	44.6	12	22.06	18	52.1	9
27.1	22.42	12	63.2	4	15.67	16	74.8	13	49.14	20	42.9	17	21.90	16	51.0	11
Oct. 7.1	22.33	9	62.9	3	15.54	13	73.1	17	48.97	17	40.9	20	21.78	12	49.7	13
17.1	22.28	5	62.7	2	15.45	9	71.1	20	48.84	13	38.5	24	21.70	8	48.3	14
27.0	22.27	1	62.7	0	15.40	5	68.8	23	48.76	8	35.7	28	21.68	2	47.0	13
Nov. 6.0	22.31	4	62.8	1	15.40	0	66.2	26	48.74	2	32.6	31	21.72	4	45.7	13
16.0	22.40	9	63.1	3	15.45	5	63.3	29	48.77	3	29.3	33	21.82	10	44.5	12
26.0	22.54	14	63.6	5	15.56	11	60.3	30	48.86	9	25.9	34	21.98	16	43.5	10
Dec. 5.9	22.74	20	64.4	8	15.72	16	57.2	31	49.01	15	22.4	35	22.21	23	42.8	7
15.9	22.98	24	65.3	9	15.93	21	54.1	31	49.22	21	19.0	34	22.50	29	42.3	5
25.9	23.26	28	66.4	11	16.18	25	51.1	30	49.48	26	15.7	33	22.84	34	42.1	2
35.9	23.56	30	67.7	13	16.47	29	48.2	29	49.79	31	12.6	31	23.21	37	42.2	1
Sec δ, Tan δ	1.043		−0.295		1.148		+0.563		1.327		+0.873		1.323		−0.866	
Mean Place	20ˢ.839		49″.92		14ˢ.527		78″.15		48ˢ.261		44″.80		20ˢ.282		30″.87	
D′ψ α, Dω α	+0.01		−0.01		−0.01		+0.02		−0.02		+0.04		+0.02		−0.04	
Dψ δ, Dω δ	−0.3		−0.8		−0.3		−0.8		−0.2		−0.8		−0.2		−0.8	

[Eph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Libræ. Mag. 4.0				α Coronæ Borealis. Mag. 2.3				ζ Cor. Bor. *seq.* Mag. 5.1				α Serpentis. Mag. 2.8			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 15 30		° ′ −14 29		h m 15 30		° ′ +26 59		h m 15 36		° ′ +36 54		h m 15 39		° ′ + 6 41	
	s		″		s		″		s		″		s		″	
Jan. 0.9	38.29		63.8		59.28		70.2		5.10		47.4		57.86		45.5	
10.8	38.60	31	65.2	14	59.58	30	67.5	27	5.41	31	44.5	29	58.15	29	43.4	21
20.8	38.93	33	66.7	15	59.91	33	65.1	24	5.75	34	42.0	25	58.46	31	41.4	20
30.8	39.27	34	68.2	15	60.25	34	63.1	20	6.11	36	40.0	20	58.78	32	39.6	18
Feb. 9.8	39.61	34	69.6	14	60.59	34	61.6	15	6.47	36	38.5	15	59.10	32	38.0	16
19.7	39.94	33	70.9	13	60.92	33	60.6	10	6.83	36	37.6	9	59.41	31	36.8	12
Mar. 1.7	40.25	31	72.1	12	61.24	32	60.1	5	7.18	35	37.2	4	59.72	31	35.9	9
11.7	40.55	30	73.2	11	61.54	30	60.1	0	7.50	32	37.4	2	60.01	29	35.4	5
21.7	40.83	28	74.1	9	61.82	28	60.6	5	7.80	30	38.2	8	60.28	27	35.2	2
31.6	41.08	25	74.8	7	62.07	25	61.6	10	8.07	27	39.5	13	60.52	24	35.4	2
Apr. 10.6	41.31	23	75.3	5	62.29	22	63.0	14	8.30	23	41.2	17	60.74	22	35.9	5
20.6	41.51	20	75.7	4	62.47	18	64.7	17	8.50	20	43.3	21	60.93	19	36.7	8
30.5	41.68	17	75.9	2	62.62	15	66.7	20	8.66	16	45.6	23	61.09	16	37.7	10
May 10.5	41.82	14	76.0	1	62.74	12	68.8	21	8.78	12	48.1	25	61.23	14	38.8	11
20.5	41.93	11	76.0	0	62.82	8	71.0	22	8.85	7	50.7	26	61.34	11	40.0	12
30.5	42.01	8	75.9	1	62.87	5	73.2	22	8.88	3	53.3	26	61.41	7	41.3	13
June 9.4	42.06	5	75.7	2	62.88	1	75.3	21	8.88	0	55.8	25	61.45	4	42.6	13
19.4	42.08	2	75.5	2	62.86	2	77.3	20	8.84	4	58.1	23	61.47	2	43.9	13
29.4	42.07	1	75.3	2	62.80	6	79.1	18	8.76	8	60.1	20	61.46	1	45.1	12
July 9.4	42.03	4	75.0	3	62.71	9	80.6	15	8.65	11	61.9	18	61.41	5	46.2	11
19.3	41.96	7	74.7	3	62.60	11	81.9	13	8.51	14	63.3	14	61.33	8	47.1	9
29.3	41.86	10	74.4	3	62.47	13	82.9	10	8.34	17	64.4	11	61.23	10	47.8	7
Aug. 8.3	41.74	12	74.1	3	62.31	16	83.5	6	8.15	19	65.1	7	61.11	12	48.4	6
18.2	41.61	13	73.7	4	62.14	17	83.8	3	7.94	21	65.4	3	60.97	14	48.8	4
28.2	41.47	14	73.3	4	61.96	18	83.7	1	7.73	21	65.2	2	60.83	14	49.0	2
Sept. 7.2	41.33	14	73.0	3	61.78	18	83.3	4	7.52	21	64.6	6	60.68	15	49.0	0
17.2	41.19	14	72.7	3	61.61	17	82.5	8	7.31	21	63.6	10	60.54	14	48.8	2
27.1	41.07	12	72.4	3	61.45	16	81.3	12	7.12	19	62.1	15	60.41	13	48.4	4
Oct. 7.1	40.98	9	72.2	2	61.32	13	79.7	16	6.96	16	60.2	19	60.30	11	47.7	7
17.1	40.92	6	72.1	1	61.23	9	77.8	19	6.84	12	58.0	22	60.22	8	46.7	10
27.1	40.90	2	72.2	1	61.18	5	75.6	22	6.76	8	55.5	25	60.19	3	45.5	12
Nov. 6.0	40.93	3	72.4	2	61.17	1	73.1	25	6.73	3	52.6	29	60.20	1	44.1	14
16.0	41.01	8	72.8	4	61.22	5	70.4	27	6.76	3	49.5	31	60.26	6	42.5	16
26.0	41.15	14	73.4	6	61.32	10	67.5	29	6.84	8	46.2	33	60.37	11	40.6	19
Dec. 5.9	41.33	18	74.2	8	61.48	16	64.5	30	6.98	14	42.8	34	60.53	16	38.5	21
15.9	41.56	23	75.2	10	61.68	20	61.5	30	7.18	20	39.5	33	60.73	20	36.4	21
25.9	41.83	27	76.4	12	61.93	25	58.5	30	7.43	25	36.3	32	60.97	24	34.2	22
35.9	42.13	30	77.8	14	62.22	29	55.7	28	7.72	29	33.3	30	61.24	27	32.1	21
Sec δ, Tan δ	1.033		−0.259		1.122		+0.510		1.251		+0.751		1.007		+0.117	
Mean Place	39ˢ.447		59″.74		60ˢ.234		84″.71		6ˢ.113		63″.86		58ˢ.890		55″.29	
D′ψ α, Dω α	+0.01		−0.01		−0.01		+0.02		−0.02		+0.03		0.00		0.00	
Dψ δ, Dω δ	−0.2		−0.8		−0.2		−0.8		−0.2		−0.8		−0.2		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Serpentis. Mag. 3.7				κ Serpentis. Mag. 4.3				μ Serpentis. Mag. 3.6				12 H. Draconis. Mag. 5.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 15 42 s		° ′ +15 41 ″		h m 15 44 s		° ′ +18 24 ″		h m 15 45 s		° ′ − 3 9 ″		h m 15 45 s		° ′ +62 51 ″	
Jan. 0.9	9.32		24.3		48.34		21.8		3.58		60.2		18.66		45.5	
10.8	9.61	29	21.9	24	48.63	29	19.3	25	3.87	29	62.0	18	19.08	42	42.5	30
20.8	9.92	31	19.7	22	48.94	31	17.0	23	4.18	31	63.7	17	19.56	48	39.9	26
30.8	10.24	32	17.7	20	49.26	32	15.0	20	4.50	32	65.3	16	20.08	52	37.9	20
Feb. 9.8	10.57	33	16.1	16	49.58	32	13.4	16	4.83	33	66.8	15	20.62	54	36.5	14
19.7	10.89	32	14.9	12	49.90	32	12.2	12	5.15	32	68.1	13	21.17	55	35.8	7
Mar. 1.7	11.20	31	14.2	7	50.21	31	11.5	7	5.46	31	69.1	10	21.71	54	35.8	0
11.7	11.49	29	13.9	3	50.51	30	11.3	2	5.75	29	69.8	7	22.22	51	36.4	6
21.7	11.76	27	14.0	1	50.79	28	11.5	2	6.02	27	70.3	5	22.69	47	37.7	13
31.6	12.01	25	14.5	5	51.04	25	12.1	6	6.27	25	70.5	2	23.11	42	39.5	18
Apr. 10.6	12.23	22	15.4	9	51.26	22	13.1	10	6.50	23	70.5	0	23.46	35	41.8	23
20.6	12.42	19	16.6	12	51.45	19	14.4	13	6.70	20	70.2	3	23.74	28	44.5	27
30.5	12.58	16	18.1	15	51.62	17	16.0	16	6.87	17	69.7	5	23.95	21	47.5	30
May 10.5	12.71	13	19.7	16	51.75	13	17.7	17	7.02	15	69.1	6	24.08	13	50.6	31
20.5	12.81	10	21.4	17	51.85	10	19.5	18	7.14	12	68.4	7	24.13	5	53.8	32
30.5	12.88	7	23.2	18	51.92	7	21.4	19	7.23	9	67.6	8	24.10	3	56.9	31
June 9.4	12.92	4	24.9	17	51.96	4	23.3	19	7.29	6	66.8	8	24.00	10	59.8	29
19.4	12.93	1	26.5	16	51.97	1	25.1	18	7.32	3	66.0	8	23.83	17	62.5	27
29.4	12.91	2	28.0	15	51.94	3	26.7	16	7.31	1	65.3	7	23.59	24	64.9	24
July 9.4	12.85	6	29.4	14	51.88	6	28.1	14	7.27	4	64.6	7	23.29	30	66.9	20
19.3	12.76	9	30.6	12	51.79	9	29.3	12	7.20	7	63.9	7	22.94	35	68.5	16
29.3	12.65	11	31.5	9	51.67	12	30.3	10	7.11	9	63.3	6	22.55	39	69.6	11
Aug. 8.3	12.52	13	32.1	6	51.53	14	31.0	7	7.00	11	62.8	5	22.13	42	70.2	6
18.2	12.37	15	32.5	4	51.38	15	31.4	4	6.87	13	62.4	4	21.69	44	70.3	1
28.2	12.21	16	32.6	1	51.22	16	31.6	2	6.73	14	62.1	3	21.23	46	69.9	4
Sept. 7.2	12.05	16	32.5	1	51.06	16	31.4	2	6.58	15	62.0	1	20.78	45	69.0	9
17.2	11.90	15	32.1	4	50.90	16	30.9	5	6.43	15	62.0	0	20.34	44	67.5	15
27.1	11.76	14	31.3	8	50.75	15	30.1	8	6.30	13	62.1	1	19.93	41	65.6	19
Oct. 7.1	11.64	12	30.2	11	50.62	13	28.9	12	6.20	10	62.4	3	19.57	36	63.2	24
17.1	11.56	8	28.9	13	50.53	9	27.4	15	6.13	7	62.8	4	19.26	31	60.4	28
27.1	11.51	5	27.3	16	50.48	5	25.7	17	6.10	3	63.4	6	19.02	24	57.3	31
Nov. 6.0	11.51	0	25.4	19	50.47	1	23.7	20	6.11	1	64.3	9	18.86	16	53.9	34
16.0	11.55	4	23.3	21	50.51	4	21.4	23	6.17	6	65.4	11	18.79	7	50.2	37
26.0	11.65	10	21.0	23	50.61	10	18.9	25	6.28	11	66.7	13	18.81	2	46.4	38
Dec. 5.9	11.80	15	18.5	25	50.75	14	16.3	26	6.44	16	68.1	14	18.92	11	42.6	38
15.9	12.00	20	15.9	26	50.94	19	13.6	27	6.64	20	69.7	16	19.13	21	38.8	38
25.9	12.24	24	13.3	26	51.18	24	11.0	26	6.89	25	71.4	17	19.43	30	35.2	36
35.9	12.51	27	10.8	25	51.45	27	8.4	26	7.17	28	73.2	18	19.81	38	32.0	32
Sec δ, Tan δ	1.039		+0.281		1.054		+0.333		1.002		−0.055		2.193		+1.951	
Mean Place	10ˢ.340		36″.23		49ˢ.366		34″.32		4ˢ.692		52″.77		20ˢ.240		65″.37	
$D'_\psi a$, $D_\omega a$	−0.01		+0.01		−0.01		+0.01		0.00		0.00		−0.04		+0.07	
$D_\psi \delta$, $D_\omega \delta$	−0.2		−0.8		−0.2		−0.8		−0.2		−0.8		−0.2		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ε Serpentis.** Mag. 3.8 Right Ascension.		Declination N.		**ζ Ursæ Minoris.** Mag. 4.3 Right Ascension.		Declination N.		**β Triang. Aust.** Mag. 3.0 Right Ascension.		Declination S.		**λ Libræ.** Mag. 5.1 Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	15 46		+ 4 43		15 47		+78 3		15 47		−63 9		15 48		−19 54	
	s		″		s		″		s		″		s		″	
Jan. 0.9	27.60		71.3		5.24		24.6		24.97		42.6		15.55		31.7	
10.9	27.88	28	69.2	21	6.00	76	21.7	29	25.55	58	41.8	8	15.86	31	32.8	11
20.8	28.19	31	67.2	20	6.90	90	19.3	24	26.17	62	41.5	3	16.19	33	34.0	12
30.8	28.51	32	65.4	18	7.91	101	17.5	18	26.81	64	41.6	1	16.54	35	35.3	13
Feb. 9.8	28.83	32	63.9	15	8.99	108	16.3	12	27.46	65	42.1	5	16.89	35	36.6	13
19.7	29.15	32	62.7	12	10.09	110	15.8	5	28.11	65	43.0	9	17.23	34	37.8	12
Mar. 1.7	29.46	31	61.8	9	11.17	108	16.0	2	28.74	63	44.3	13	17.56	33	38.9	11
11.7	29.75	29	61.2	6	12.20	103	16.8	8	29.34	60	45.9	16	17.87	31	40.0	11
21.7	30.02	27	61.0	2	13.15	95	18.2	14	29.91	57	47.8	19	18.16	29	41.0	10
31.6	30.27	25	61.1	1	13.98	83	20.2	20	30.43	52	49.9	21	18.43	27	41.8	8
Apr. 10.6	30.49	22	61.5	4	14.67	69	22.6	24	30.90	47	52.2	23	18.68	25	42.5	7
20.6	30.69	20	62.2	7	15.19	52	25.4	28	31.32	42	54.6	24	18.90	22	43.0	5
30.6	30.86	17	63.1	9	15.54	35	28.4	30	31.68	36	57.2	26	19.10	20	43.4	4
May 10.5	31.00	14	64.2	11	15.70	16	31.5	31	31.97	29	59.8	26	19.27	17	43.8	4
20.5	31.12	12	65.4	12	15.67	3	34.7	32	32.19	22	62.4	26	19.40	13	44.1	3
30.5	31.20	8	66.6	12	15.47	20	37.8	31	32.34	15	65.0	26	19.50	10	44.3	2
June 9.4	31.25	5	67.8	12	15.10	37	40.7	29	32.42	8	67.5	25	19.57	7	44.4	1
19.4	31.27	2	69.0	12	14.57	53	43.4	27	32.42	0	69.8	23	19.61	4	44.5	1
29.4	31.26	1	70.1	11	13.89	68	45.7	23	32.35	7	71.8	20	19.61	0	44.5	0
July 9.4	31.22	4	71.1	10	13.09	80	47.6	19	32.20	15	73.6	18	19.58	3	44.5	0
19.3	31.15	7	72.0	9	12.18	91	49.0	14	31.99	21	75.1	15	19.52	6	44.4	1
29.3	31.06	9	72.7	7	11.18	100	50.0	10	31.72	27	76.2	11	19.43	9	44.2	2
Aug. 8.3	30.94	12	73.3	6	10.12	106	50.5	5	31.41	31	76.9	7	19.31	12	44.0	2
18.3	30.80	14	73.7	4	9.02	110	50.4	1	31.06	35	77.2	3	19.17	14	43.7	3
28.2	30.65	15	74.0	3	7.91	111	49.8	6	30.69	37	77.0	2	19.02	15	43.4	3
Sept. 7.2	30.50	15	74.1	1	6.82	109	48.7	11	30.32	37	76.4	6	18.87	15	43.0	4
17.2	30.36	14	73.9	2	5.76	106	47.1	16	29.97	35	75.4	10	18.72	15	42.6	4
27.1	30.23	13	73.5	4	4.76	100	45.0	21	29.65	32	73.9	15	18.58	14	42.2	4
Oct. 7.1	30.12	11	72.9	6	3.85	91	42.5	25	29.38	27	72.1	18	18.47	11	41.8	4
17.1	30.04	8	72.1	8	3.06	79	39.7	28	29.18	20	70.1	20	18.40	7	41.5	3
27.1	30.00	4	71.0	11	2.42	64	36.5	32	29.07	11	67.9	22	18.37	3	41.3	2
Nov. 6.0	30.01	1	69.7	13	1.93	49	33.0	35	29.06	1	65.6	23	18.39	2	41.2	1
16.0	30.07	6	68.2	15	1.62	31	29.3	37	29.15	9	63.2	24	18.46	7	41.2	0
26.0	30.17	10	66.5	17	1.51	11	25.5	38	29.34	19	61.0	22	18.58	12	41.4	2
Dec. 6.0	30.32	15	64.6	19	1.60	9	21.7	38	29.64	30	59.0	20	18.75	17	41.8	4
15.9	30.52	20	62.6	20	1.89	29	18.0	37	30.03	39	57.2	18	18.97	22	42.4	6
25.9	30.76	24	60.5	21	2.37	48	14.5	35	30.50	47	55.8	14	19.23	26	43.2	8
35.9	31.03	27	58.4	21	3.03	66	11.4	31	31.04	54	54.7	11	19.53	30	44.2	10
Sec δ, Tan δ	1.003		+0.083		4.833		+4.728		2.215		−1.977		1.064		−0.362	
Mean Place	28ˢ.671		80″.67		8ˢ.506		45″.33		27ˢ.977		47″.51		16ˢ.841		28″.28	
D′ψ α, Dω α	0.00		0.00		−0.10		+0.17		+0.04		−0.07		+0.01		−0.01	
Dψ δ, Dω δ	−0.2		−0.8		−0.2		−0.8		−0.2		−0.8		−0.2		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**γ Serpentis.** Mag. 3.9				**π Scorpii.** Mag. 3.0				**ε Coronæ Borealis.** Mag. 4.2				**δ Scorpii.** Mag. 2.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	15 52		+15 56		15 53		−25 51		15 53		+27 7		15 55		−22 22	
	s		″		s		″		s		″		s		″	
Jan. 0.9	24.96		29.7		33.74		54.2		58.00		30.7		9.81		32.8	
10.9	25.24	28	27.2	25	34.07	33	55.0	8	58.28	28	27.9	28	10.12	31	33.7	9
20.8	25.55	31	24.9	23	34.42	35	56.0	10	58.59	31	25.4	25	10.46	34	34.8	11
30.8	25.87	32	22.9	20	34.78	36	57.1	11	58.92	33	23.3	21	10.81	35	35.9	11
Feb. 9.8	26.19	32	21.3	16	35.14	36	58.2	11	59.26	34	21.7	16	11.16	35	37.1	12
19.7	26.51	32	20.1	12	35.49	35	59.4	12	59.59	33	20.6	11	11.51	35	38.3	12
Mar. 1.7	26.82	31	19.3	8	35.83	34	60.5	11	59.91	32	19.9	7	11.85	34	39.4	11
11.7	27.12	30	18.9	4	36.16	33	61.6	11	60.22	31	19.8	1	12.17	32	40.4	10
21.7	27.40	28	18.9	0	36.47	31	62.7	11	60.51	29	20.2	4	12.47	30	41.4	10
31.6	27.65	25	19.4	5	36.76	29	63.7	10	60.77	26	21.1	9	12.75	28	42.3	9
Apr. 10.6	27.88	23	20.3	9	37.02	26	64.6	9	61.01	24	22.5	14	13.00	25	43.1	8
20.6	28.08	20	21.5	12	37.25	23	65.4	8	61.22	21	24.2	17	13.23	23	43.7	6
30.6	28.25	17	22.9	14	37.46	21	66.2	8	61.39	17	26.1	19	13.44	21	44.2	5
May 10.5	28.39	14	24.5	16	37.64	18	66.9	7	61.53	14	28.2	21	13.62	18	44.7	5
20.5	28.50	11	26.2	17	37.79	15	67.5	6	61.63	10	30.5	23	13.76	14	45.1	4
30.5	28.58	8	28.0	18	37.91	12	68.0	5	61.70	7	32.8	23	13.87	11	45.4	3
June 9.4	28.63	5	29.8	18	37.99	8	68.5	5	61.73	3	35.1	23	13.95	8	45.7	3
19.4	28.65	2	31.5	17	38.03	4	68.9	4	61.73	0	37.2	21	14.00	5	45.9	2
29.4	28.63	2	33.0	15	38.03	0	69.2	3	61.69	4	39.1	19	14.01	1	46.0	1
July 9.4	28.58	5	34.3	13	38.00	3	69.4	2	61.62	7	40.8	17	13.98	3	46.1	1
19.3	28.50	8	35.5	12	37.94	6	69.6	2	61.52	10	42.3	15	13.92	6	46.1	0
29.3	28.39	11	36.5	10	37.84	10	69.7	1	61.39	13	43.5	12	13.83	9	46.0	1
Aug. 8.3	28.26	13	37.2	7	37.72	12	69.6	1	61.23	16	44.3	8	13.71	12	45.9	1
18.3	28.11	15	37.6	4	37.58	14	69.4	2	61.06	17	44.7	4	13.57	14	45.7	2
28.2	27.95	16	37.7	1	37.42	16	69.1	3	60.88	18	44.8	1	13.42	15	45.4	3
Sept. 7.2	27.79	16	37.6	1	37.26	16	68.7	4	60.69	19	44.5	3	13.26	16	45.0	4
17.2	27.63	16	37.2	4	37.10	16	68.2	5	60.50	19	43.9	6	13.10	16	44.6	4
27.1	27.48	15	36.4	8	36.96	14	67.6	6	60.33	17	42.9	10	12.96	14	44.1	5
Oct. 7.1	27.36	12	35.3	11	36.84	12	67.0	6	60.18	15	41.5	14	12.85	11	43.6	5
17.1	27.27	9	34.0	13	36.76	8	66.4	6	60.07	11	39.8	17	12.77	8	43.2	4
27.1	27.21	6	32.4	16	36.72	4	65.8	6	60.00	7	37.7	21	12.73	4	42.8	4
Nov. 6.0	27.20	1	30.5	19	36.73	1	65.3	5	59.97	3	35.3	24	12.74	1	42.5	3
16.0	27.24	4	28.4	21	36.79	6	65.0	3	59.99	2	32.7	26	12.80	6	42.4	1
26.0	27.33	9	26.0	24	36.91	12	64.9	1	60.06	7	29.8	29	12.92	12	42.5	1
Dec. 6.0	27.47	14	23.5	25	37.09	18	64.9	0	60.19	13	26.8	30	13.09	17	42.8	3
15.9	27.65	18	20.9	26	37.32	23	65.1	2	60.37	18	23.8	30	13.31	22	43.2	4
25.9	27.88	23	18.3	26	37.59	27	65.5	4	60.59	22	20.8	30	13.57	26	43.8	6
35.9	28.14	26	15.8	25	37.90	31	66.2	7	60.86	27	18.0	28	13.87	30	44.6	8
Sec δ, Tan δ	1.040		+0.286		1.111		−0.485		1.124		+0.512		1.081		−0.412	
Mean Place	$26^{s}.028$		$41''.73$		$35^{s}.147$		$51''.93$		$59^{s}.079$		$45''.05$		$11^{s}.162$		$29''.55$	
D′ψ α, Dω α	−0.01		+0.01		+0.01		−0.02		−0.01		+0.02		+0.01		−0.01	
Dψ δ, Dω δ	−0.2		−0.8		−0.2		−0.9		−0.2		−0.9		−0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Draconis. Mag. 4.1				β Scorpii. Mag. 2.9				κ Herculis. Mag. 5.3				φ Herculis. Mag. 4.3			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	16 0		+58 47		16 0		−19 34		16 4		+17 16		16 6		+45 9	
	s		″		s		″		s		″		s		″	
Jan. 0.9	13.90	36	31.5	32	21.18	30	9.0	11	7.70	27	28.0	25	0.40	30	28.0	31
10.9	14.26	42	28.3	27	21.48	33	10.1	11	7.97	30	25.5	23	0.70	34	24.9	27
20.8	14.68	46	25.6	22	21.81	34	11.2	12	8.27	31	23.2	20	1.04	37	22.2	23
30.8	15.14	48	23.4	16	22.15	34	12.4	12	8.58	32	21.2	16	1.41	38	19.9	17
Feb. 9.8	15.62	49	21.8	9	22.49	34	13.6	11	8.90	32	19.6	13	1.79	39	18.2	11
19.8	16.11	49	20.9	2	22.83	33	14.7	11	9.22	32	18.3	8	2.18	38	17.1	5
Mar. 1.7	16.60	47	20.7	4	23.16	32	15.8	10	9.54	30	17.5	3	2.56	37	16.6	1
11.7	17.07	43	21.1	11	23.48	30	16.8	9	9.84	28	17.2	1	2.93	35	16.7	8
21.7	17.50	39	22.2	16	23.78	28	17.7	7	10.12	26	17.3	6	3.28	32	17.5	14
31.6	17.89	34	23.8	21	24.06	26	18.4	6	10.38	24	17.9	9	3.60	28	18.9	18
Apr. 10.6	18.23	28	25.9	26	24.32	23	19.0	5	10.62	21	18.8	13	3.88	24	20.7	22
20.6	18.51	22	28.5	29	24.55	21	19.5	4	10.83	18	20.1	15	4.12	20	22.9	25
30.6	18.73	15	31.4	31	24.76	18	19.9	3	11.01	15	21.6	17	4.32	15	25.4	28
May 10.5	18.88	8	34.5	32	24.94	15	20.2	2	11.16	12	23.3	19	4.47	10	28.2	29
20.5	18.96	2	37.7	31	25.09	11	20.4	1	11.28	9	25.2	19	4.57	6	31.1	29
30.5	18.98	5	40.8	30	25.20	8	20.5	1	11.37	6	27.1	19	4.63	1	34.0	28
June 9.5	18.93	12	43.8	28	25.28	5	20.6	0	11.43	2	29.0	18	4.64	4	36.8	27
19.4	18.81	17	46.6	25	25.33	1	20.6	0	11.45	1	30.8	17	4.60	8	39.5	25
29.4	18.64	23	49.1	22	25.34	2	20.6	0	11.44	5	32.5	15	4.52	13	42.0	22
July 9.4	18.41	28	51.3	18	25.32	6	20.6	1	11.39	8	34.0	13	4.39	16	44.2	18
19.3	18.13	32	53.1	13	25.26	9	20.5	2	11.31	10	35.3	11	4.23	20	46.0	14
29.3	17.81	36	54.4	9	25.17	11	20.3	2	11.21	13	36.4	8	4.03	23	47.4	10
Aug. 8.3	17.45	38	55.3	4	25.06	14	20.1	2	11.08	15	37.2	5	3.80	25	48.4	5
18.3	17.07	40	55.7	1	24.92	15	19.9	3	10.93	16	37.7	3	3.55	26	48.9	1
28.2	16.67	40	55.6	6	24.77	16	19.6	3	10.77	17	38.0	1	3.29	27	49.0	4
Sept. 7.2	16.27	39	55.0	12	24.61	15	19.3	3	10.60	17	37.9	4	3.02	27	48.6	9
17.2	15.88	36	53.8	17	24.46	14	19.0	4	10.43	16	37.5	7	2.75	25	47.7	14
27.2	15.52	33	52.1	21	24.32	11	18.6	4	10.27	13	36.8	10	2.50	22	46.3	18
Oct. 7.1	15.19	29	50.0	26	24.21	8	18.2	3	10.14	11	35.8	13	2.28	19	44.5	22
17.1	14.90	23	47.4	29	24.13	4	17.9	2	10.03	7	34.5	16	2.09	15	42.3	26
27.1	14.67	16	44.5	33	24.09	0	17.7	1	9.96	2	32.9	19	1.94	9	39.7	30
Nov. 6.0	14.51	8	41.2	35	24.09	5	17.6	0	9.94	3	31.0	21	1.85	3	36.7	32
16.0	14.43	1	37.7	37	24.14	11	17.6	2	9.97	7	28.9	23	1.82	3	33.5	34
26.0	14.44	9	34.0	38	24.25	16	17.8	4	10.04	12	26.6	25	1.85	10	30.1	35
Dec. 6.0	14.53	17	30.2	37	24.41	21	18.2	6	10.16	17	24.1	26	1.95	16	26.6	35
15.9	14.70	25	26.5	36	24.62	25	18.8	8	10.33	22	21.5	26	2.11	22	23.1	35
25.9	14.95	32	22.9	34	24.87	29	19.6	9	10.55	26	18.9	26	2.33	27	19.6	33
35.9	15.27		19.5		25.16		20.5		10.81		16.3		2.60		16.3	
Sec δ, Tan δ	1.930		+1.651		1.061		−0.356		1.047		+0.311		1.418		+1.006	
Mean Place	15ˢ.491		50″.44		22ˢ.506		4″.95		8ˢ.817		40″.34		1ˢ.705		45″.21	
D′ψ α, Dω α	−0.04		+0.06		+0.01		−0.01		−0.01		+0.01		−0.02		+0.03	
Dψ δ, Dω δ	−0.2		−0.9		−0.2		−0.9		−0.2		−0.9		−0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**Groombridge 2320.** Mag. 5.4				**δ^1 Apodis.** Mag. 4.8				**δ Ophiuchi.** Mag. 3.0				**σ Cor. Bor.** *seq.* Mag. 5.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 16 6		° ′ +68 1		h m 16 7		° ′ −78 28		h m 16 9		° ′ − 3 28		h m 16 11		° ′ +34 4	
	s		″		s		″		s		″		s		″	
Jan. 0.9	2.67		61.6		11.32		37.6		45.88		23.6		23.99		27.8	
10.9	3.11	44	58.4	32	12.43	111	36.0	16	46.16	28	25.3	17	24.27	28	24.9	29
20.8	3.63	52	55.7	27	13.66	123	34.9	11	46.46	30	26.9	16	24.58	31	22.3	26
30.8	4.21	58	53.5	22	14.98	132	34.3	6	46.77	31	28.5	16	24.91	33	20.0	23
Feb. 9.8	4.83	62	52.0	15	16.35	137	34.2	1	47.09	32	29.9	14	25.25	34	18.2	18
19.8	5.47	64	51.1	9	17.73	138	34.6	4	47.41	32	31.1	12	25.60	35	17.0	12
Mar. 1.7	6.11	64	50.9	2	19.10	137	35.5	9	47.72	31	32.1	10	25.94	34	16.4	6
11.7	6.73	62	51.4	5	20.42	132	36.8	13	48.02	30	32.8	7	26.26	32	16.3	1
21.7	7.31	58	52.5	11	21.68	126	38.5	17	48.31	29	33.2	4	26.57	31	16.8	5
31.6	7.83	52	54.2	17	22.86	118	40.5	20	48.58	27	33.3	1	26.86	29	17.8	10
Apr. 10.6	8.28	45	56.4	22	23.93	107	42.9	24	48.82	24	33.2	1	27.12	26	19.3	15
20.6	8.65	37	59.0	26	24.88	95	45.5	26	49.04	22	32.9	3	27.35	23	21.2	19
30.6	8.93	28	62.0	30	25.69	81	48.4	29	49.24	20	32.4	5	27.54	19	23.4	22
May 10.5	9.11	18	65.1	31	26.35	66	51.4	30	49.41	17	31.7	7	27.69	15	25.8	24
20.5	9.19	8	68.3	32	26.84	49	54.5	31	49.55	14	30.9	8	27.81	12	28.4	26
30.5	9.17	2	71.5	32	27.16	32	57.6	31	49.66	11	30.1	8	27.89	8	31.0	26
June 9.5	9.06	11	74.6	31	27.31	15	60.6	30	49.74	8	29.3	8	27.93	4	33.6	26
19.4	8.86	20	77.5	29	27.28	3	63.5	29	49.79	5	28.5	8	27.93	0	36.0	24
29.4	8.58	28	80.1	26	27.07	21	66.2	27	49.80	1	27.7	8	27.89	4	38.2	22
July 9.4	8.22	36	82.3	22	26.69	38	68.6	24	49.78	2	26.9	8	27.81	8	40.2	20
19.3	7.79	43	84.1	18	26.16	53	70.7	21	49.73	5	26.2	7	27.69	12	41.9	17
29.3	7.30	49	85.4	13	25.49	67	72.4	17	49.65	8	25.6	6	27.54	15	43.3	14
Aug. 8.3	6.77	53	86.3	9	24.71	78	73.7	13	49.54	11	25.1	5	27.37	17	44.4	11
18.3	6.21	56	86.7	4	23.85	86	74.5	8	49.41	13	24.7	4	27.18	19	45.0	6
28.2	5.63	58	86.5	2	22.93	92	74.7	2	49.26	15	24.4	3	26.97	21	45.2	2
Sept. 7.2	5.04	59	85.8	7	22.00	93	74.3	4	49.11	15	24.2	2	26.75	22	45.0	2
17.2	4.46	58	84.6	12	21.10	90	73.4	9	48.96	15	24.1	1	26.54	21	44.4	6
27.2	3.91	55	82.9	17	20.26	84	72.0	14	48.82	14	24.2	1	26.34	20	43.3	11
Oct. 7.1	3.41	50	80.7	22	19.53	73	70.2	18	48.70	12	24.4	2	26.16	18	41.8	15
17.1	2.97	44	78.1	26	18.94	59	68.0	22	48.61	9	24.8	4	26.01	15	40.0	18
27.1	2.61	36	75.1	30	18.53	41	65.5	25	48.56	5	25.4	6	25.90	11	37.8	22
Nov. 6.0	2.34	27	71.8	33	18.32	21	62.7	28	48.55	1	26.2	8	25.83	7	35.2	26
16.0	2.17	17	68.2	86	18.33	1	59.8	29	48.59	4	27.2	10	25.82	1	32.4	28
26.0	2.11	6	64.4	38	18.56	23	56.9	29	48.68	9	28.4	12	25.87	5	29.3	31
Dec. 6.0	2.16	5	60.6	38	19.02	46	54.1	28	48.81	13	29.8	14	25.97	10	26.1	32
15.9	2.33	17	56.9	37	19.69	67	51.6	25	48.99	18	31.3	15	26.12	15	22.9	32
25.9	2.61	28	53.3	36	20.55	86	49.4	22	49.22	23	32.9	16	26.33	21	19.7	32
35.9	2.99	38	49.9	34	21.58	103	47.5	19	49.48	26	34.6	17	26.59	26	16.6	31
Sec δ, Tan δ	2.673		+2.479		5.008		−4.907		1.002		−0.061		1.207		+0.676	
Mean Place	4ˢ.861		81″.02		18ˢ.308		42″.43		47ˢ.090		15″.58		25ˢ.205		43″.24	
$D'_\psi \alpha$, $D_\omega \alpha$	−0.06		+0.08		+0.11		−0.16		0.00		0.00		−0.02		+0.02	
$D_\psi \delta$, $D_\omega \delta$	−0.2		−0.9		−0.2		−0.9		−0.2		−0.9		−0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	19 Ursæ Minoris. Mag. 5.5				γ² Normæ. Mag. 4.1				ε Ophiuchi. Mag. 3.3				σ Scorpii. Mag. 3.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 16 13		° ′ +76 5		h m 16 13		° ′ −49 56		h m 16 13		° ′ − 4 28		h m 16 15		° ′ −25 23	
	s		″		s		″		s		″		s		″	
Jan. 0.9	13.94		29.6		17.15		34.1		41.75		60.0		52.39		9.1	
10.9	14.53	59	26.5	31	17.56	41	33.6	5	42.03	28	61.7	17	52.70	31	9.7	6
20.8	15.25	72	23.8	27	18.00	44	33.4	2	42.33	30	63.3	16	53.03	33	10.5	8
30.8	16.08	83	21.6	22	18.46	46	33.5	1	42.64	31	64.8	15	53.38	35	11.4	9
Feb. 9.8	16.98	90	20.1	15	18.94	48	33.9	4	42.96	32	66.2	14	53.74	36	12.4	10
19.8	17.92	94	19.2	9	19.42	48	34.6	7	43.28	32	67.4	12	54.09	35	13.4	10
Mar. 1.7	18.87	95	19.0	2	19.89	47	35.6	10	43.60	32	68.3	9	54.43	34	14.4	10
11.7	19.80	93	19.5	5	20.34	45	36.8	12	43.90	30	69.0	7	54.77	34	15.3	9
21.7	20.67	87	20.6	11	20.77	43	38.1	13	44.18	28	69.4	4	55.09	32	16.2	9
31.7	21.45	78	22.3	17	21.18	41	39.6	15	44.45	27	69.6	2	55.39	30	17.0	8
Apr. 10.6	22.12	67	24.5	22	21.56	38	41.2	16	44.70	25	69.5	1	55.67	28	17.7	7
20.6	22.66	54	27.1	26	21.90	34	42.9	17	44.93	23	69.2	3	55.93	26	18.4	7
30.6	23.06	40	30.0	29	22.21	31	44.7	18	45.13	20	68.7	5	56.16	23	19.0	6
May 10.5	23.31	25	33.1	31	22.47	26	46.6	19	45.30	17	68.1	6	56.36	20	19.6	6
20.5	23.40	9	36.3	32	22.69	22	48.5	19	45.45	15	67.4	7	56.53	17	20.1	5
30.5	23.34	6	39.5	32	22.86	17	50.3	18	45.57	12	66.6	8	56.67	14	20.5	4
June 9.5	23.13	21	42.6	31	22.97	11	52.1	18	45.65	8	65.8	8	56.77	10	20.9	4
19.4	22.77	36	45.5	29	23.03	6	53.8	17	45.70	5	65.0	8	56.83	6	21.3	4
29.4	22.27	50	48.1	26	23.04	1	55.4	16	45.72	2	64.2	8	56.86	3	21.6	3
July 9.4	21.65	62	50.3	22	23.00	4	56.8	14	45.71	1	63.5	7	56.85	1	21.8	2
19.4	20.93	72	52.1	18	22.90	10	58.0	12	45.66	5	62.8	7	56.80	5	21.9	1
29.3	20.12	81	53.5	14	22.76	14	58.9	9	45.58	8	62.2	6	56.72	8	22.0	1
Aug. 8.3	19.24	88	54.4	9	22.58	18	59.5	6	45.47	11	61.7	5	56.61	11	22.0	0
18.3	18.31	93	54.8	4	22.37	21	59.8	3	45.34	13	61.3	4	56.47	14	21.9	1
28.2	17.35	96	54.7	1	22.13	24	59.8	0	45.20	14	61.0	3	56.31	16	21.7	2
Sept. 7.2	16.38	97	54.0	7	21.88	25	59.4	4	45.05	15	60.8	2	56.14	17	21.4	3
17.2	15.43	95	52.8	12	21.63	25	58.7	7	44.90	15	60.7	1	55.97	17	21.0	4
27.2	14.52	91	51.1	17	21.40	23	57.7	10	44.76	14	60.8	1	55.82	15	20.5	5
Oct. 7.1	13.68	84	49.0	21	21.21	19	56.5	12	44.64	12	61.0	2	55.69	13	20.0	5
17.1	12.93	75	46.4	26	21.06	15	55.0	15	44.54	10	61.4	4	55.59	10	19.5	5
27.1	12.29	64	43.4	30	20.97	9	53.4	16	44.48	6	61.9	5	55.53	6	19.0	5
Nov. 6.1	11.78	51	40.1	33	20.94	3	51.7	17	44.47	1	62.6	7	55.52	1	18.6	4
16.0	11.42	36	36.6	35	20.98	4	50.0	17	44.51	4	63.5	9	55.56	4	18.3	3
26.0	11.23	19	32.9	37	21.10	12	48.4	16	44.59	8	64.6	11	55.66	10	18.1	2
Dec. 6.0	11.21	2	29.1	38	21.30	20	46.9	15	44.72	13	65.9	13	55.81	15	18.1	0
15.9	11.37	16	25.4	37	21.57	27	45.6	13	44.90	18	67.3	14	56.02	21	18.2	1
25.9	11.70	33	21.8	36	21.90	33	44.6	10	45.12	22	68.9	16	56.27	25	18.5	3
35.9	12.19	49	18.5	33	22.28	38	43.8	8	45.38	26	70.5	16	56.56	29	19.0	5
Sec δ, Tan δ	4.161		+4.039		1.554		−1.189		1.003		−0.078		1.107		−0.475	
Mean Place	$17^{s}.411$		$49''.07$		$19^{s}.306$		$35''.08$		$42^{s}.983$		$52''.15$		$53^{s}.855$		$5''.52$	
$D'_{\psi}\, a$, $D_{\omega}\, a$	−0.10		+0.12		+0.03		−0.04		0.00		0.00		+0.01		−0.02	
$D_{\psi}\, \delta$, $D_{\omega}\, \delta$	−0.2		−0.9		−0.2		−0.9		−0.2		−0.9		−0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**τ Herculis.** Mag. 3.9				**γ Herculis.** Mag. 3.8				**η Ursæ Minoris.** Mag. 5.0				**γ Apodis.** Mag. 3.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 16 17		° ′ +46 30		h m 16 18		° ′ +19 21		h m 16 19		° ′ +75 56		h m 16 19		° ′ −78 42	
	s		″		s		″		s		″		s		″	
Jan. 0.9	6.13		55.1		3.71		11.5		58.32		63.4		57.00		9.7	
10.9	6.42	29	51.9	32	3.97	26	8.9	26	58.88	56	60.2	32	58.09	109	7.9	18
20.8	6.76	34	49.1	28	4.26	29	6.5	24	59.57	69	57.4	28	59.32	123	6.6	13
30.8	7.13	37	46.7	24	4.57	31	4.5	20	60.37	80	55.2	22	60.64	132	5.8	8
Feb. 9.8	7.51	38	44.9	18	4.89	32	2.8	17	61.25	88	53.6	16	62.02	138	5.5	3
19.8	7.90	39	43.7	12	5.21	32	1.5	13	62.18	93	52.6	10	63.43	141	5.7	2
Mar. 1.7	8.29	39	43.1	6	5.53	32	0.7	8	63.12	94	52.3	3	64.83	140	6.3	6
11.7	8.67	38	43.2	1	5.83	30	0.4	3	64.04	92	52.7	4	66.20	137	7.4	11
21.7	9.03	36	43.9	7	6.12	29	0.5	1	64.91	87	53.7	10	67.51	131	8.9	15
31.7	9.36	33	45.2	13	6.39	27	1.1	6	65.70	79	55.3	16	68.74	123	10.8	19
Apr. 10.6	9.65	29	47.0	18	6.64	25	2.1	10	66.38	68	57.5	22	69.88	114	13.0	22
20.6	9.91	26	49.2	22	6.86	22	3.4	13	66.94	56	60.1	26	70.90	102	15.5	25
30.6	10.12	21	51.7	25	7.05	19	5.0	16	67.36	42	63.0	29	71.78	88	18.2	27
May 10.5	10.29	17	54.5	28	7.22	17	6.9	19	67.63	27	66.1	31	72.51	73	21.1	29
20.5	10.41	12	57.5	30	7.36	14	8.9	20	67.75	12	69.3	32	73.08	57	24.1	30
30.5	10.48	7	60.5	30	7.46	10	10.9	20	67.71	4	72.5	32	73.47	39	27.2	31
June 9.5	10.50	2	63.4	29	7.52	6	12.9	20	67.52	19	75.6	31	73.68	21	30.2	30
19.4	10.47	3	66.1	27	7.55	3	14.9	20	67.19	33	78.5	29	73.70	2	33.1	29
29.4	10.39	8	68.7	26	7.55	0	16.7	18	66.72	47	81.2	27	73.54	16	35.9	28
July 9.4	10.27	12	71.0	23	7.51	4	18.4	17	66.13	59	83.6	24	73.21	33	38.4	25
19.4	10.10	17	72.9	19	7.44	7	19.9	15	65.43	70	85.5	19	72.71	50	40.6	22
29.3	9.90	20	74.5	16	7.33	11	21.1	12	64.63	80	87.0	15	72.06	65	42.4	18
Aug. 8.3	9.67	23	75.6	11	7.20	13	22.0	9	63.76	87	88.0	10	71.29	77	43.8	14
18.3	9.41	26	76.3	7	7.05	15	22.6	6	62.84	92	88.5	5	70.43	86	44.7	9
28.2	9.14	27	76.5	2	6.88	17	22.9	3	61.89	95	88.5	0	69.50	93	45.1	4
Sept. 7.2	8.86	28	76.2	3	6.71	17	22.9	0	60.93	96	87.9	6	68.55	95	45.0	1
17.2	8.58	28	75.4	8	6.54	17	22.6	3	59.98	95	86.8	11	67.61	94	44.3	7
27.2	8.31	27	74.1	13	6.37	17	22.0	6	59.07	91	85.2	16	66.73	88	43.1	12
Oct. 7.1	8.07	24	72.4	17	6.22	15	21.0	10	58.22	85	83.2	20	65.95	78	41.4	17
17.1	7.86	21	70.3	21	6.10	12	19.7	13	57.45	77	80.7	25	65.30	65	39.2	22
27.1	7.69	17	67.8	25	6.01	9	18.1	16	56.79	66	77.8	29	64.82	48	36.7	25
Nov. 6.1	7.58	11	64.9	29	5.97	4	16.2	19	56.26	53	74.6	32	64.55	27	34.0	27
16.0	7.53	5	61.7	32	5.98	1	14.0	22	55.88	38	71.2	34	64.50	5	31.1	29
26.0	7.54	1	58.3	34	6.04	6	11.6	24	55.66	22	67.5	37	64.67	17	28.2	29
Dec. 6.0	7.62	8	54.7	36	6.15	11	9.0	26	55.62	4	63.7	38	65.07	40	25.4	28
15.9	7.77	15	51.1	36	6.31	16	6.3	27	55.75	13	60.0	37	65.70	63	22.8	26
25.9	7.98	21	47.6	35	6.51	20	3.6	27	56.05	30	56.4	36	66.53	83	20.4	24
35.9	8.24	26	44.3	33	6.75	24	1.0	26	56.51	46	53.0	34	67.53	100	18.3	21
Sec δ, Tan δ	1.453		+1.054		1.060		+0.351		4.120		+3.997		5.107		−5.008	
Mean Place	7ˢ.543		72″.11		4ˢ.894		24″.19		61ˢ.903		82″.43		64ˢ.215		13″.33	
D′ψ α, Dω α	−0.03		+0.03		−0.01		+0.01		−0.10		+0.11		+0.12		−0.14	
Dψ δ, Dω δ	−0.2		−0.9		−0.2		−0.9		−0.2		−0.9		−0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ω Herculis.** Mag. 4.5				**η Draconis.** Mag. 2.9				**α Scorpii.** Mag. 1.2				**β Herculis.** Mag. 2.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	16 21		+14 13		16 22		+61 42		16 24		−26 14		16 26		+21 40	
	s		″		s		″		s		″		s		″	
Jan. 0.9	22.61	26	46.7	24	46.69	35	20.9	33	2.73	30	27.0	5	27.50	26	29.3	26
10.9	22.87	28	44.3	22	47.04	41	17.6	29	3.03	33	27.5	7	27.76	28	26.7	24
20.8	23.15	30	42.1	20	47.45	46	14.7	24	3.36	34	28.2	8	28.04	30	24.3	21
30.8	23.45	32	40.1	17	47.91	50	12.3	18	3.70	36	29.0	9	28.34	32	22.2	18
Feb. 9.8	23.77	32	38.4	13	48.41	52	10.5	11	4.06	36	29.9	9	28.66	32	20.4	14
19.8	24.09	31	37.1	8	48.93	53	9.4	5	4.42	35	30.8	9	28.98	32	19.0	8
Mar. 1.7	24.40	30	36.3	4	49.46	51	8.9	2	4.77	34	31.7	9	29.30	31	18.2	3
11.7	24.70	29	35.9	0	49.97	48	9.1	9	5.11	32	32.6	8	29.61	30	17.9	2
21.7	24.99	27	35.9	4	50.45	45	10.0	15	5.43	31	33.4	8	29.91	28	18.1	6
31.7	25.26	25	36.3	8	50.90	40	11.5	20	5.74	29	34.2	7	30.19	25	18.7	10
Apr. 10.6	25.51	22	37.1	12	51.30	33	13.5	24	6.03	26	34.9	6	30.44	23	19.7	14
20.6	25.73	20	38.3	14	51.63	27	15.9	28	6.29	24	35.5	6	30.67	20	21.1	17
30.6	25.93	17	39.7	16	51.90	20	18.7	31	6.53	21	36.1	6	30.87	17	22.8	19
May 10.5	26.10	14	41.3	17	52.10	12	21.8	32	6.74	18	36.7	5	31.04	14	24.7	21
20.5	26.24	11	43.0	18	52.22	5	25.0	32	6.92	15	37.2	5	31.18	11	26.8	22
30.5	26.35	7	44.8	18	52.27	3	28.2	31	7.07	11	37.7	4	31.29	7	29.0	22
June 9.5	26.42	4	46.6	18	52.24	10	31.3	30	7.18	7	38.1	4	31.36	3	31.2	21
19.4	26.46	0	48.4	16	52.14	17	34.3	28	7.25	3	38.5	3	31.39	0	33.3	20
29.4	26.46	3	50.0	15	51.97	24	37.1	24	7.28	0	38.8	3	31.39	4	35.3	18
July 9.4	26.43	6	51.5	13	51.73	30	39.5	21	7.28	4	39.1	2	31.35	7	37.1	15
19.4	26.37	9	52.8	11	51.43	34	41.6	16	7.24	8	39.3	1	31.28	10	38.6	13
29.3	26.28	12	53.9	9	51.09	39	43.2	11	7.16	11	39.4	1	31.18	13	39.9	10
Aug. 8.3	26.16	14	54.8	6	50.70	42	44.3	7	7.05	14	39.5	0	31.05	16	40.9	7
18.3	26.02	16	55.4	3	50.28	44	45.0	2	6.91	16	39.5	2	30.89	17	41.6	4
28.2	25.86	17	55.7	1	49.84	46	45.2	4	6.75	16	39.3	3	30.72	18	42.0	0
Sept. 7.2	25.69	17	55.8	2	49.38	45	44.8	9	6.59	17	39.0	4	30.54	18	42.0	3
17.2	25.52	16	55.6	5	48.93	43	43.9	14	6.42	16	38.6	4	30.36	18	41.7	6
27.2	25.36	14	55.1	8	48.50	40	42.5	19	6.26	14	38.2	5	30.18	16	41.1	10
Oct. 7.1	25.22	11	54.3	11	48.10	35	40.6	23	6.12	10	37.7	5	30.02	13	40.1	13
17.1	25.11	8	53.2	14	47.75	30	38.3	28	6.02	7	37.2	5	29.89	9	38.8	17
27.1	25.03	4	51.8	17	47.45	23	35.5	32	5.95	2	36.7	5	29.80	5	37.1	20
Nov. 6.1	24.99	1	50.1	19	47.22	14	32.3	34	5.93	3	36.2	4	29.75	1	35.1	22
16.0	25.00	6	48.2	21	47.08	5	28.9	36	5.96	9	35.8	3	29.74	4	32.9	25
26.0	25.06	11	46.1	23	47.03	3	25.3	37	6.05	15	35.5	1	29.78	10	30.4	26
Dec. 6.0	25.17	16	43.8	24	47.06	13	21.6	38	6.20	20	35.4	1	29.88	15	27.8	27
15.9	25.33	20	41.4	25	47.19	22	17.8	37	6.40	24	35.5	2	30.03	19	25.1	28
25.9	25.53	24	38.9	24	47.41	30	14.1	35	6.64	28	35.7	4	30.22	24	22.3	28
35.9	25.77		36.5		47.71		10.6		6.92		36.1		30.46		19.5	
Sec δ, Tan δ	1.032		+0.254		2.110		+1.858		1.115		−0.493		1.076		+0.397	
Mean Place	$23^{s}.798$		58″.43		$48^{s}.659$		39″.21		$4^{s}.226$		23″.10		$28^{s}.722$		42″.39	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	−0.01		+0.01		−0.04		+0.05		+0.01		−0.01		−0.01		+0.01	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.2		−0.9		−0.2		−0.9		−0.2		−0.9		−0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON

Mean Solar Date.	**λ Ophiuchi.** Mag. 3.8				**A Draconis.** Mag. 5.0				**τ Scorpii.** Mag. 2.9				**σ Herculis.** Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 16 26		° ′ + 2 10		h m 16 28		° ′ +68 56		h m 16 30		° ′ −28 2		h m 16 31		° ′ +42 36	
	s		″		s		″		s		″		s		″	
Jan. 0.9	30.22		15.6		6.24		64.6		26.28		14.9		16.44		40.9	
10.9	30.48	26	13.7	19	6.64	40	61.3	33	26.58	30	15.3	4	16.71	27	37.8	31
20.9	30.77	29	11.9	18	7.13	49	58.4	29	26.91	33	15.8	5	17.02	31	34.9	29
30.8	31.08	31	10.2	17	7.70	57	56.0	24	27.26	35	16.5	7	17.36	34	32.4	25
Feb. 9.8	31.39	31	8.7	15	8.32	62	54.2	18	27.62	36	17.3	8	17.72	36	30.5	19
19.8	31.70	31	7.5	12	8.97	65	53.0	12	27.98	36	18.1	8	18.09	37	29.2	13
Mar. 1.7	32.01	31	6.6	9	9.63	66	52.5	5	28.33	35	18.9	8	18.46	37	28.4	8
11.7	32.31	30	6.0	6	10.28	65	52.7	2	28.68	35	19.8	9	18.83	37	28.3	1
21.7	32.60	29	5.8	2	10.90	62	53.6	9	29.02	34	20.6	8	19.18	35	28.8	5
31.7	32.87	27	5.9	1	11.47	57	55.1	15	29.34	32	21.4	8	19.50	32	29.9	11
Apr. 10.6	33.12	25	6.2	3	11.97	50	57.1	20	29.63	29	22.1	7	19.79	29	31.5	16
20.6	33.35	23	6.8	6	12.39	42	59.6	25	29.90	27	22.8	7	20.05	26	33.6	21
30.6	33.56	21	7.7	9	12.72	33	62.4	28	30.15	25	23.4	6	20.27	22	36.0	24
May 10.6	33.74	18	8.7	10	12.96	24	65.5	31	30.37	22	24.0	6	20.45	18	38.7	27
20.5	33.89	15	9.8	11	13.10	14	68.7	32	30.56	19	24.6	6	20.59	14	41.5	28
30.5	34.02	13	11.0	12	13.14	4	72.0	33	30.72	16	25.2	6	20.68	9	44.4	29
June 9.5	34.11	9	12.2	12	13.07	7	75.2	32	30.84	12	25.7	5	20.73	5	47.3	29
19.4	34.17	6	13.4	12	12.90	17	78.2	30	30.92	8	26.2	5	20.73	0	50.1	28
29.4	34.19	2	14.5	11	12.64	26	81.0	28	30.96	4	26.6	4	20.68	5	52.7	26
July 9.4	34.18	1	15.6	11	12.30	34	83.5	25	30.96	0	27.0	4	20.59	9	55.0	23
19.4	34.13	5	16.5	9	11.88	42	85.6	21	30.92	4	27.3	3	20.46	13	57.0	20
29.3	34.05	8	17.3	8	11.39	49	87.2	16	30.84	8	27.5	2	20.29	17	58.7	17
Aug. 8.3	33.95	10	18.0	7	10.84	55	88.4	12	30.73	11	27.6	1	20.08	21	60.0	13
18.3	33.82	13	18.5	5	10.25	59	89.1	7	30.59	14	27.7	1	19.85	23	60.8	8
28.3	33.67	15	18.8	3	9.63	62	89.3	2	30.43	16	27.6	1	19.60	25	61.2	4
Sept. 7.2	33.52	15	19.0	2	9.00	63	88.9	4	30.26	17	27.4	2	19.34	26	61.1	1
17.2	33.36	16	19.0	0	8.38	62	88.0	9	30.09	17	27.0	4	19.08	26	60.6	5
27.2	33.21	15	18.8	2	7.78	60	86.6	14	29.93	16	26.5	5	18.83	25	59.6	10
Oct. 7.1	33.08	13	18.4	4	7.22	56	84.7	19	29.79	14	26.0	5	18.60	23	58.1	15
17.1	32.98	10	17.8	6	6.71	51	82.4	23	29.68	11	25.4	6	18.40	20	56.2	19
27.1	32.91	7	17.0	8	6.27	44	79.6	28	29.60	8	24.8	6	18.24	16	53.9	23
Nov. 6.1	32.88	3	15.9	11	5.93	34	76.5	31	29.57	3	24.2	6	18.13	11	51.2	27
16.0	32.90	2	14.6	13	5.69	24	73.1	34	29.60	3	23.7	5	18.07	6	48.2	30
26.0	32.96	6	13.2	14	5.56	13	69.5	36	29.69	9	23.3	4	18.07	0	45.0	32
Dec. 6.0	33.07	11	11.6	16	5.55	1	65.7	38	29.83	14	23.1	2	18.13	6	41.6	34
16.0	33.23	16	9.8	18	5.66	11	61.9	38	30.02	19	23.0	1	18.26	13	38.1	35
25.9	33.44	21	7.9	19	5.88	22	58.2	37	30.26	24	23.1	1	18.45	19	34.7	34
35.9	33.69	25	6.0	19	6.22	34	54.7	35	30.54	28	23.4	3	18.69	24	31.4	33
Sec δ, Tan δ	1.001		+0.038		2.784		+2.599		1.133		−0.533		1.359		+0.920	
Mean Place	$31^{\mathrm{s}}.459$		25″.03		$8^{\mathrm{s}}.844$		82″.98		$27^{\mathrm{s}}.824$		11″.01		$17^{\mathrm{s}}.882$		56″.94	
$D'_{\psi}\,a$, $D_{\omega}\,a$	0.00		0.00		−0.06		+0.07		+0.01		−0.01		−0.02		+0.02	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.2		−0.9		−0.2		−0.9		−0.2		−0.9		−0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ζ Ophiuchi.** Mag. 2.7				**24 Scorpii.** Mag. 5.0				**ζ Herculis.** Mag. 3.0				***α* Triang. Aust.** Mag. 1.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 16 32		° ′ −10 23		h m 16 36		° ′ −17 34		h m 16 37		° ′ +31 45		h m 16 39		° ′ −68 52	
	s		″		s		″		s		″		s		″	
Jan. 0.9	20.66		37.1		30.94		34.3		59.04		20.9		22.47		8 5	
10.9	20.93	27	38.4	13	31.22	28	35.2	9	59.29	25	18.0	29	23.08	61	6.9	16
20.9	21.23	30	39.7	13	31.52	30	36.2	10	59.57	28	15.3	27	23.76	68	5.7	12
30.8	21.54	31	41.0	13	31.84	32	37.2	10	59.88	31	13.0	23	24.50	74	4.9	8
Feb. 9.8	21.86	32	42.2	12	32.17	33	38.2	10	60.21	33	11.1	19	25.28	78	4.5	4
19.8	22.18	32	43.2	10	32.51	34	39.1	9	60.54	33	9.7	14	26.08	80	4.5	0
Mar. 1.7	22.50	32	44.0	8	32.84	33	39.9	8	60.87	33	8.9	8	26.88	80	4.9	4
11.7	22.81	31	44.7	7	33.16	32	40.6	7	61.20	33	8.6	3	27.67	79	5.7	8
21.7	23.11	30	45.2	5	33.47	31	41.2	6	61.52	32	8.9	3	28.43	76	6.9	12
31.7	23.40	29	45.5	3	33.77	30	41.7	5	61.81	29	9.7	8	29.16	73	8.4	15
Apr. 10.6	23.67	27	45.6	1	34.05	28	42.0	3	62.08	27	11.0	13	29.84	68	10.2	18
20.6	23.91	24	45.5	1	34.31	26	42.2	2	62.33	25	12.8	18	30.46	62	12.2	20
30.6	24.13	22	45.3	2	34.54	23	42.3	1	62.55	22	14.9	21	31.02	56	14.4	22
May 10.6	24.33	20	44.9	4	34.75	21	42.3	0	62.73	18	17.3	24	31.50	48	16.8	24
20.5	24.50	17	44.5	4	34.93	18	42.3	0	62.88	15	19.8	25	31.90	40	19.4	26
30.5	24.64	14	44.0	5	35.08	15	42.2	1	62.99	11	22.4	26	32.21	31	22.0	26
June 9.5	24.74	10	43.5	5	35.20	12	42.1	1	63.06	7	25.0	26	32.42	21	24.6	26
19.4	24.81	7	42.9	6	35.28	8	41.9	2	63.09	3	27.5	25	32.53	11	27.2	26
29.4	24.85	4	42.4	5	35.32	4	41.8	1	63.07	2	29.9	24	32.54	1	29.7	25
July 9.4	24.85	0	41.9	5	35.33	1	41.6	2	63.02	5	32.0	21	32.45	9	32.0	23
19.4	24.81	4	41.4	5	35.30	3	41.5	1	62.93	9	33.9	19	32.26	19	34.0	20
29.3	24.74	7	41.0	4	35.23	7	41.4	1	62.81	12	35.5	16	31.99	27	35.7	17
Aug. 8.3	24.64	10	40.7	3	35.13	10	41.2	2	62.65	16	36.7	12	31.64	35	37.1	14
18.3	24.52	12	40.4	3	35.00	13	41.0	2	62.47	18	37.6	9	31.22	42	38.0	9
28.3	24.38	14	40.1	3	34.86	14	40.8	2	62.27	20	38.1	5	30.76	46	38.5	5
Sept. 7.2	24.23	15	39.9	2	34.71	15	40.6	2	62.06	21	38.2	1	30.27	49	38.5	0
17.2	24.07	16	39.7	2	34.55	16	40.3	3	61.84	22	37.9	3	29.78	49	38.0	5
27.2	23.92	15	39.6	1	34.39	16	40.1	2	61.63	21	37.2	7	29.31	47	37.1	9
Oct. 7.1	23.79	13	39.6	0	34.25	14	39.9	2	61.44	19	36.0	12	28.89	42	35.7	14
17.1	23.69	10	39.7	1	34.14	11	39.7	2	61.28	16	34.4	16	28.53	36	33.9	18
27.1	23.62	7	39.9	2	34.07	7	39.6	1	61.15	13	32.5	19	28.27	26	31.8	21
Nov. 6.1	23.59	3	40.3	4	34.04	3	39.6	0	61.06	9	30.2	23	28.11	16	29.5	23
16.0	23.61	2	40.8	5	34.06	2	39.7	1	61.02	4	27.6	26	28.07	4	27.0	25
26.0	23.68	7	41.5	7	34.13	7	40.0	3	61.04	2	24.8	28	28.16	9	24.4	26
Dec. 6.0	23.80	12	42.4	9	34.25	12	40.4	4	61.11	7	21.8	30	28.37	21	21.9	25
16.0	23.97	17	43.4	10	34.42	17	40.9	5	61.24	13	18.7	31	28.71	34	19.5	24
25.9	24.18	21	44.5	11	34.64	22	41.6	7	61.42	18	15.6	31	29.17	46	17.3	22
35.9	24.43	25	45.8	13	34.90	26	42.4	8	61.64	22	12.5	31	29.72	55	15.5	18
Sec δ, Tan δ	1.017		−0.183		1.049		−0.317		1.176		+0.619		2.774		−2.588	
Mean Place	21^{s}.991		29″.88		32^{s}.353		28″.27		60^{s}.373		35″.38		26^{s}.462		9″.73	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	0.00		0.00		+0.01		−0.01		−0.02		+0.01		+0.06		−0.06	
$D_\psi\,\delta$, $D_\omega\,\delta$	−0.1		−0.9		−0.1		−0.9		−0.1		−0.9		−0.1		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**η Herculis.** Mag. 3.6				**Groombridge 2377.** Mag 4.9				**ε Scorpii.** Mag. 2.4				**49 Herculis.** Mag. 6.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 16 39		° ′ +39 4		h m 16 43		° ′ +56 55		h m 16 44		° ′ −34 8		h m 16 48		° ′ +15 6	
	s		″		s		″		s		″		s		″	
Jan. 0.9	53.33		58.2		36.86		56.6		29.81		14.3		5.87		58.0	
10.9	53.59	26	55.1	31	37.15	29	53.2	34	30.12	31	14.3	0	6.11	24	55.6	24
20.9	53.88	29	52.3	28	37.50	35	50.1	31	30.46	34	14.5	2	6.38	27	53.4	22
30.8	54.20	32	49.8	25	37.90	40	47.5	26	30.82	36	14.8	3	6.67	29	51.4	20
Feb. 9.8	54.54	34	47.8	20	38.33	43	45.5	20	31.19	37	15.3	5	6.97	30	49.7	17
19.8	54.89	35	46.4	14	38.78	45	44.1	14	31.57	38	15.9	6	7.28	31	48.3	14
Mar. 1.8	55.25	36	45.6	8	39.25	47	43.3	8	31.95	38	16.6	7	7.59	31	47.4	9
11.7	55.60	35	45.3	3	39.71	46	43.2	1	32.32	37	17.3	7	7.90	31	46.9	5
21.7	55.94	34	45.7	4	40.15	44	43.8	6	32.68	36	18.1	8	8.20	30	46.9	0
31.7	56.26	32	46.7	10	40.56	41	45.0	12	33.02	34	18.9	8	8.48	28	47.3	4
Apr. 10.6	56.55	29	48.2	15	40.94	38	46.8	18	33.34	32	19.7	8	8.74	26	48.1	8
20.6	56.81	26	50.1	19	41.27	33	49.1	23	33.64	30	20.6	9	8.98	24	49.3	12
30.6	57.04	23	52.4	23	41.55	28	51.8	27	33.92	28	21.5	9	9.20	22	50.7	14
May 10.6	57.23	19	55.0	26	41.77	22	54.7	29	34.17	25	22.3	8	9.40	20	52.4	17
20.5	57.38	15	57.7	27	41.93	16	57.8	31	34.38	21	23.1	8	9.56	16	54.3	19
30.5	57.48	10	60.5	28	42.02	9	61.0	32	34.55	17	24.0	9	9.69	.13	56.2	19
June 9.5	57.54	6	63.3	28	42.05	3	64.2	32	34.69	14	24.8	8	9.79	10	58.1	19
19.5	57.56	2	66.1	28	42.01	4	67.3	31	34.79	10	25.6	8	9.85	6	60.0	19
29.4	57.53	3	68.7	26	41.91	10	70.2	29	34.85	6	26.4	8	9.88	3	61.8	18
July 9.4	57.46	7	71.0	23	41.75	16	72.8	26	34.86	1	27.1	7	9.87	1	63.5	17
19.4	57.35	11	73.1	21	41.53	22	75.1	23	34.83	3	27.8	7	9.82	5	65.0	15
29.3	57.20	15	74.8	17	41.26	27	77.0	19	34.75	8	28.3	5	9.74	8	66.3	13
Aug. 8.3	57.02	18	76.1	13	40.95	31	78.4	14	34.63	12	28.7	4	9.63	11	67.3	10
18.3	56.81	21	77.0	9	40.60	35	79.4	10	34.48	15	28.9	2	9.50	13	68.1	8
28.3	56.58	23	77.5	5	40.23	37	79.9	5	34.31	17	28.9	0	9.34	16	68.6	5
Sept. 7.2	56.34	24	77.5	0	39.85	38	79.9	0	34.13	18	28.8	1	9.17	17	68.8	2
17.2	56.09	25	77.1	4	39.46	39	79.3	6	33.94	19	28.5	3	8.99	18	68.7	1
27.2	55.85	24	76.2	9	39.08	38	78.2	11	33.76	18	28.0	5	8.82	17	68.3	4
Oct. 7.2	55.63	22	74.9	13	38.72	36	76.7	15	33.60	16	27.3	7	8.66	16	67.6	7
17.1	55.44	19	73.2	17	38.40	32	74.7	20	33.47	13	26.6	7	8.53	13	66.6	10
27.1	55.29	15	71.1	21	38.13	27	72.2	25	33.37	10	25.8	8	8.43	10	65.3	13
Nov. 6.1	55.18	11	68.6	25	37.92	21	69.3	29	33.32	5	24.9	9	8.37	6	63.8	15
16.0	55.12	6	65.8	28	37.77	15	66.1	32	33.33	1	24.1	8	8.36	1	62.0	18
26.0	55.12	0	62.7	31	37.70	7	62.7	34	33.40	7	23.4	7	8.39	3	59.9	21
Dec. 6.0	55.18	6	59.4	33	37.71	1	59.1	36	33.53	13	22.7	7	8.47	8	57.6	23
16.0	55.30	12	56.0	34	37.80	9	55.4	37	33.72	19	22.2	5	8.60	13	55.2	24
25.9	55.47	17	52.7	33	37.97	17	51.7	37	33.96	24	21.9	3	8.77	17	52.7	25
35.9	55.70	23	49.4	33	38.22	25	48.1	36	34.24	28	21.7	2	8.99	22	50.3	24
Sec δ, Tan δ	1.288		+0.812		1.833		+1.536		1.208		−0.678		1.036		+0.270	
Mean Place	$54^{s}.761$		73″.57		$38^{s}.797$		73″.47		$31^{s}.509$		10″.77		$7^{s}.162$		69″.85	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	−0.02		+0.02		−0.04		+0.03		+0.02		−0.01		−0.01		+0.01	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.1		−0.9		−0.1		−0.9		−0.1		−0.9		−0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε¹ Aræ. Mag. 4.2 Right Ascension.		ε¹ Aræ. Mag. 4.2 Declination S.		κ Ophiuchi. Mag. 3.4 Right Ascension.		κ Ophiuchi. Mag. 3.4 Declination N.		30 Ophiuchi. Mag. 5.0 Right Ascension.		30 Ophiuchi. Mag. 5.0 Declination S.		ε Herculis. Mag. 3.9 Right Ascension.		ε Herculis. Mag. 3.9 Declination N.	
	h m 16 52		° ′ −53 1		h m 16 53		° ′ + 9 30		h m .16 56		° ′ − 4 5		h m 16 56		° ′ +31 2	
	s		″		s		″		s		″		s		″	
Jan. 0.9	36.26		42.3		31.66		23.4		27.00		43.2		56.21		60.2	
10.9	36.65	39	41.3	10	31.89	23	21.3	21	27.25	25	44.8	16	56.44	23	57.2	30
20.9	37.08	43	40.5	8	32.15	26	19.2	21	27.52	27	46.3	15	56.71	27	54.4	28
30.8	37.55	47	40.0	5	32.44	29	17.3	19	27.81	29	47.7	14	57.01	30	52.0	24
Feb. 9.8	38.04	49	39.8	2	32.74	30	15.7	16	28.11	30	48.9	12	57.32	31	50.0	20
19.8	38.54	50	39.9	1	33.05	31	14.4	13	28.42	31	49.9	10	57.64	32	48.5	15
Mar. 1.8	39.04	50	40.3	4	33.36	31	13.5	9	28.74	32	50.7	8	57.97	33	47.6	9
11.7	39.54	50	40.9	6	33.66	30	13.0	5	29.05	31	51.3	6	58.30	33	47.2	4
21.7	40.03	49	41.8	9	33.95	29	12.9	1	29.35	30	51.6	3	58.62	32	47.3	1
31.7	40.50	47	42.9	11	34.23	28	13.2	3	29.63	28	51.6	0	58.93	31	48.0	7
Apr. 10.7	40.94	44	44.1	12	34.50	27	13.9	7	29.90	27	51.4	2	59.22	29	49.2	12
20.6	41.35	41	45.5	14	34.75	25	14.8	9	30.16	26	51.0	4	59.48	26	50.9	17
30.6	41.72	37	47.1	16	34.98	23	16.0	12	30.40	24	50.4	6	59.71	23	52.9	20
May 10.6	42.05	33	48.8	17	35.18	20	17.4	14	30.61	21	49.6	8	59.91	20	55.2	23
20.5	42.34	29	50.6	18	35.35	17	19.0	16	30.79	18	48.7	9	60.08	17	57.7	25
30.5	42.58	24	52.4	18	35.49	14	20.7	17	30.95	16	47.8	9	60.21	13	60.3	26
June 9.5	42.76	18	54.3	19	35.60	11	22.4	17	31.07	12	46.8	10	60.30	9	62.9	26
19.5	42.89	13	56.1	18	35.67	7	24.0	16	31.16	9	45.8	10	60.35	5	65.5	26
29.4	42.95	6	57.9	18	35.70	3	25.6	16	31.21	5	44.9	9	60.36	1	68.0	25
July 9.4	42.95	0	59.5	16	35.70	0	27.1	15	31.23	2	44.1	8	60.33	3	70.2	22
19.4	42.89	6	61.0	15	35.67	3	28.4	13	31.21	2	43.4	7	60.25	8	72.2	20
29.4	42.77	12	62.3	13	35.60	7	29.5	11	31.15	6	42.7	7	60.14	11	73.9	17
Aug. 8.3	42.60	17	63.3	10	35.50	10	30.5	10	31.06	9	42.1	6	60.00	14	75.3	14
18.3	42.39	21	64.0	7	35.37	13	31.2	7	30.94	12	41.6	5	59.83	17	76.4	11
28.3	42.15	24	64.4	4	35.22	15	31.7	5	30.80	14	41.3	3	59.63	20	77.1	7
Sept. 7.2	41.88	27	64.5	1	35.06	16	31.9	2	30.65	15	41.1	2	59.42	21	77.4	3
17.2	41.60	28	64.2	3	34.89	17	31.9	0	30.49	16	41.0	1	59.20	22	77.2	2
27.2	41.33	27	63.5	7	34.72	17	31.6	3	30.33	16	41.0	0	58.99	21	76.6	6
Oct. 7.2	41.09	24	62.5	10	34.57	15	31.1	5	30.19	14	41.2	2	58.79	20	75.6	10
17.1	40.89	20	61.2	13	34.44	13	30.3	8	30.07	12	41.5	3	58.62	17	74.2	14
27.1	40.74	15	59.7	15	34.34	10	29.3	10	29.98	9	42.0	5	58.48	14	72.4	18
Nov. 6.1	40.65	9	58.0	17	34.28	6	28.0	13	29.93	5	42.7	7	58.38	10	70.3	21
16.1	40.64	1	56.2	18	34.27	1	26.5	15	29.93	0	43.5	8	58.32	6	67.9	24
26.0	40.70	6	54.4	18	34.30	3	24.7	18	29.97	4	44.5	10	58.32	0	65.2	27
Dec. 6.0	40.84	14	52.6	18	34.38	8	22.7	20	30.06	9	45.7	12	58.37	5	62.3	29
16.0	41.06	22	50.9	17	34.51	13	20.6	21	30.20	14	47.0	13	58.48	11	59.2	31
25.9	41.35	29	49.4	15	34.68	17	18.4	22	30.38	18	48.4	14	58.64	16	56.1	31
35.9	41.71	36	48.2	12	34.90	22	16.3	21	30.61	23	49.9	15	58.84	20	53.0	31
Sec δ, Tan δ	1.663		−1.329		1.014		+0.167		1.003		−0.072		1.167		+0.602	
Mean Place	$38^{s}.664$		40″.72		$32^{s}.962$		34″.34		$28^{s}.348$		34″.36		$57^{s}.627$		73″.97	
D′ψ α, Dω α	+0.03		−0.03		0.00		0.00		0.00		0.00		−0.02		+0.01	
Dψ δ, Dω δ	−0.1		−1.0		−0.1		−1.0		−0.1		−1.0		−0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*d* Herculis. Mag. 5.3				*η* Ophiuchi. Mag. 2.6				*η* Scorpii. Mag. 3.4				*ζ* Draconis. Mag. 3.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 16 58 s		° ′ +33 41 ″		h m 17 5 s		° ′ −15 37 ″		h m 17 5 s		° ′ −43 7 ″		h m 17 8 s		° ′ +65 48 ″	
Jan. 0.9	22.11		22.7		21.75		12.1		53.17		35.9		29.18		62.1	
10.9	22.34	23	19.7	30	22.00	25	13.0	9	53.49	32	35.3	6	29.46	28	58.6	35
20.9	22.61	27	16.9	28	22.28	28	13.9	9	53.85	36	34.8	5	29.83	37	55.4	32
30.9	22.91	30	14.4	25	22.58	30	14.8	9	54.23	38	34.5	3	30.28	45	52.6	28
Feb. 9.8	23.23	32	12.3	21	22.90	32	15.6	8	54.64	41	34.5	0	30.79	51	50.4	22
19.8	23.56	33	10.8	15	23.22	32	16.4	8	55.06	42	34.7	2	31.34	55	48.7	17
Mar. 1.8	23.90	34	9.9	9	23.55	33	17.1	7	55.48	42	35.0	3	31.92	58	47.7	10
11.7	24.23	33	9.5	4	23.87	32	17.6	5	55.90	42	35.5	5	32.50	58	47.4	3
21.7	24.56	33	9.7	2	24.19	32	18.0	4	56.31	41	36.1	6	33.07	57	47.8	4
31.7	24.87	31	10.4	7	24.50	31	18.3	3	56.71	40	36.9	8	33.62	55	48.8	10
Apr. 10.7	25.16	29	11.6	12	24.79	29	18.4	1	57.09	38	37.8	9	34.12	50	50.4	16
20.6	25.43	27	13.3	17	25.06	27	18.3	1	57.45	36	38.8	10	34.56	44	52.6	22
30.6	25.67	24	15.4	21	25.31	25	18.1	2	57.78	33	39.9	11	34.94	38	55.2	26
May 10.6	25.87	20	17.8	24	25.54	23	17.9	2	58.08	30	41.0	11	35.25	31	58.1	29
20.6	26.04	17	20.4	26	25.75	21	17.6	3	58.34	26	42.2	12	35.47	22	61.2	31
30.5	26.17	13	23.1	27	25.93	18	17.3	3	58.57	23	43.4	12	35.60	13	64.5	33
June 9.5	26.26	9	25.8	27	26.07	14	17.0	3	58.75	18	44.7	13	35.64	4	67.8	33
19.5	26.31	5	28.5	27	26.17	10	16.7	3	58.88	13	46.0	13	35.60	4	71.1	33
29.4	26.31	0	31.1	26	26.24	7	16.4	3	58.96	8	47.2	12	35.47	13	74.2	31
July 9.4	26.27	4	33.4	23	26.27	3	16.1	3	58.99	3	48.4	12	35.25	22	77.0	28
19.4	26.19	8	35.5	21	26.26	1	15.8	3	58.97	2	49.5	11	34.95	30	79.6	26
29.4	26.07	12	37.3	18	26.21	5	15.6	2	58.90	7	50.5	10	34.58	37	81.8	22
Aug. 8.3	25.92	15	38.7	14	26:13	8	15.4	2	58.78	12	51.3	8	34.15	43	83.5	17
18.3	25.74	18	39.8	11	26.02	11	15.2	2	58.62	16	51.9	6	33.67	48	84.8	13
28.3	25.54	20	40.5	7	25.88	14	15.0	2	58.43	19	52.2	3	33.15	52	85.6	8
Sept. 7.3	25.32	22	40.8	3	25.72	16	14.9	1	58.22	21	52.3	1	32.61	54	85.9	3
17.2	25.09	23	40.6	2	25.56	16	14.7	2	58.00	22	52.1	2	32.05	56	85.7	2
27.2	24.87	22	40.0	6	25.40	16	14.6	1	57.79	21	51.7	4	31.50	55	84.9	8
Oct. 7.2	24.66	21	39.0	10	25.25	15	14.5	1	57.59	20	51.0	7	30.97	53	83.6	13
17.1	24.48	18	37.5	15	25.13	12	14.4	1	57.42	17	50.1	9	30.48	49	81.8	18
27.1	24.33	15	35.7	18	25.04	9	14.4	0	57.29	13	49.0	11	30.04	44	79.6	22
Nov. 6.1	24.22	11	33.5	22	24.98	6	14.5	1	57.21	8	47.8	12	29.67	37	76.9	27
16.1	24.16	6	30.9	26	24.97	1	14.7	2	57.19	2	46.5	13	29.39	28	73.9	30
26.0	24.15	1	28.1	28	25.01	4	15.0	3	57.24	5	45.2	13	29.20	19	70.5	34
Dec. 6.0	24.20	5	25.1	30	25.11	10	15.4	4	57.35	11	44.0	12	29.11	9	66.9	36
16.0	24.30	10	22.0	31	25.25	14	16.0	6	57.53	18	42.9	11	29.12	1	63.2	37
26.0	24.45	15	18.8	32	25.43	18	16.7	7	57.77	24	41.9	10	29.24	12	59.5	37
35.9	24.65	20	15.7	31	25.66	23	17.5	8	58.06	29	41.0	9	29.46	22	55.9	36
Sec δ, Tan δ	1.202		+0.667		1.038		−0.280		1.370		−0.937		2.441		+2.227	
Mean Place	23ˢ.568		36″.79		23ˢ.200		4″.72		55ˢ.150		32″.22		31ˢ.967		78″.04	
D′ψ a, Dω a	−0.02		+0.01		+0.01		0.00		+0.02		−0.01		−0.06		+0.03	
Dψ δ, Dω δ	−0.1		−1.0		−0.1		−1.0		−0.1		−1.0		−0.1		−1.0	

[Eph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**α Herculis.** Var. 3.1–3.9				**δ Herculis.** Mag. 3.2				**π Herculis.** Mag. 3.4				**59 Apodis (G.).** Mag. 5.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	17 10		+14 28		17 11		+24 56		17 11		+36 53		17 15		−80 46	
	s		″		s		″		s		″		s		″	
Jan. 0.9	39.43	22	67.9	24	26.02	22	15.3	28	59.40	22	69.8	31	1.26	109	52.2	24
10.9	39.65	25	65.5	22	26.24	25	12.5	26	59.62	26	66.7	29	2.35	128	49.8	21
20.9	39.90	27	63.3	20	26.49	28	9.9	23	59.88	29	63.8	26	3.63	144	47.7	17
30.9	40.17	29	61.3	17	26.77	30	7.6	19	60.17	32	61.2	21	5.07	157	46.0	12
Feb. 9.8	40.46	31	59.6	14	27.07	31	5.7	15	60.49	33	59.1	16	6.64	166	44.8	8
19.8	40.77	31	58.2	9	27.38	32	4.2	10	60.82	34	57.5	11	8.30	170	44.0	3
Mar. 1.8	41.08	30	57.3	5	27.70	31	3.2	5	61.16	34	56.4	5	10.00	172	43.7	2
11.7	41.38	30	56.8	1	28.01	31	2.7	0	61.50	34	55.9	1	11.72	170	43.9	6
21.7	41.68	29	56.7	4	28.32	30	2.7	5	61.84	33	56.0	7	13.42	165	44.5	10
31.7	41.97	28	57.1	8	28.62	29	3.2	10	62.17	31	56.7	13	15.07	157	45.5	14
Apr. 10.7	42.25	26	57.9	11	28.91	27	4.2	14	62.48	28	58.0	17	16.64	145	46.9	18
20.6	42.51	24	59.0	14	29.18	24	5.6	18	62.76	25	59.7	21	18.09	132	48.7	21
30.6	42.75	21	60.4	16	29.42	21	7.4	20	63.01	22	61.8	24	19.41	116	50.8	24
May 10.6	42.96	18	62.0	18	29.63	18	9.4	23	63.23	18	64.2	27	20.57	98	53.2	27
20.6	43.14	16	63.8	20	29.81	15	11.7	24	63.41	15	66.9	28	21.55	78	55.9	28
30.5	43.30	12	65.8	20	29.96	11	14.1	25	63.56	10	69.7	29	22.33	57	58.7	29
June 9.5	43.42	8	67.8	19	30.07	7	16.6	24	63.66	6	72.6	29	22.90	34	61.6	30
19.5	43.50	5	69.7	19	30.14	4	19.0	23	63.72	1	75.5	27	23.24	10	64.6	29
29.4	43.55	1	71.6	18	30.18	1	21.3	21	63.73	3	78.2	25	23.34	14	67.5	28
July 9.4	43.56	3	73.4	16	30.17	5	23.4	19	63.70	8	80.7	22	23.20	36	70.3	26
19.4	43.53	7	75.0	14	30.12	8	25.3	17	63.62	12	82.9	20	22.84	57	72.9	24
29.4	43.46	10	76.4	11	30.04	12	27.0	14	63.50	16	84.9	16	22.27	77	75.3	20
Aug. 8.3	43.36	13	77.5	9	29.92	15	28.4	11	63.34	19	86.5	13	21.50	94	77.3	15
18.3	43.23	15	78.4	6	29.77	17	29.5	8	63.15	22	87.8	8	20.56	107	78.8	11
28.3	43.08	17	79.0	3	29.60	19	30.3	4	62.93	23	88.6	4	19.49	115	79.9	6
Sept. 7.3	42.91	18	79.3	0	29.41	20	30.7	0	62.70	24	89.0	0	18.34	119	80.5	0
17.2	42.73	17	79.3	2	29.21	20	30.7	4	62.46	24	89.0	5	17.15	118	80.5	5
27.2	42.56	16	79.1	5	29.01	19	30.3	8	62.22	23	88.5	9	15.97	112	80.0	11
Oct. 7.2	42.40	15	78.6	8	28.82	16	29.5	11	61.99	20	87.6	14	14.85	101	78.9	16
17.1	42.25	12	77.8	12	28.66	14	28.4	15	61.79	17	86.2	18	13.84	84	77.3	21
27.1	42.13	8	76.6	15	28.52	10	26.9	18	61.62	13	84.4	22	13.00	63	75.2	25
Nov. 6.1	42.05	3	75.1	17	28.42	5	25.1	22	61.49	9	82.2	25	12.37	39	72.7	28
16.1	42.02	1	73.4	19	28.37	1	22.9	24	61.40	3	79.7	28	11.98	13	69.9	29
26.0	42.03	6	71.5	21	28.36	4	20.5	26	61.37	2	76.9	31	11.85	15	67.0	30
Dec. 6.0	42.09	11	69.4	23	28.40	10	17.9	28	61.39	8	73.8	32	12.00	43	64.0	30
16.0	42.20	15	67.1	24	28.50	15	15.1	28	61.47	14	70.6	33	12.43	69	61.0	29
26.0	42.35	20	64.7	23	28.65	19	12.3	28	61.61	19	67.3	32	13.12	94	58.1	26
35.9	42.55		62.4		28.84		9.5		61.80		64.1		14.06		55.5	
Sec δ, Tan δ	1.033		+0.258		1.103		+0.465		1.251		+0.751		6.244		−6.163	
Mean Place	40ˢ.792		79″.44		27ˢ.443		28″.07		60ˢ.962		83″.79		10ˢ.247		50″.95	
D′ψ a, Dω a	−0.01		0.00		−0.01		+0.01		−0.02		+0.01		+0.16		−0.08	
Dψ δ, Dω δ	−0.1		−1.0		−0.1		−1.0		−0.1		−1.0		−0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**θ Ophiuchi.** Mag. 3.4				**ω Herculis.** Mag. 5.4				**β Aræ.** Mag. 2.8				**b Ophiuchi.** Mag. 4.3			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	17 16		−24 54		17 17		+32 34		17 18		−55 26		17 21		−24 5	
	s		″		s		″		s		″		s		″	
Jan. 0.9	38.32		55.5		22.67		30.9		1.33		58.4		1.74		53.5	
10.9	38.57	25	55.8	3	22.88	21	27.8	31	1.71	38	57.0	14	1.98	24	53.8	3
20.9	38.86	29	56.2	4	23.13	25	25.0	28	2.13	42	55.9	11	2.26	28	54.2	4
30.9	39.17	31	56.6	4	23.41	28	22.5	25	2.59	46	55.0	9	2.57	31	54.6	4
Feb. 9.8	39.50	33	57.1	5	23.72	31	20.4	21	3.09	50	54.4	6	2.90	33	55.1	5
19.8	39.84	34	57.6	5	24.04	32	18.7	17	3.61	52	54.1	3	3.24	34	55.6	5
Mar. 1.8	40.19	35	58.1	5	24.37	33	17.6	11	4.14	53	54.1	0	3.58	34	56.0	4
11.8	40.53	34	58.5	4	24.70	33	17.0	6	4.67	53	54.4	3	3.92	34	56.4	4
21.7	40.87	34	58.9	4	25.03	33	17.0	0	5.19	52	54.9	5	4.26	34	56.7	3
31.7	41.20	33	59.2	3	25.35	32	17.6	6	5.69	50	55.6	7	4.59	33	57.0	3
Apr. 10.7	41.52	32	59.5	3	25.65	30	18.7	11	6.18	49	56.6	10	4.90	31	57.2	2
20.6	41.82	30	59.7	2	25.93	28	20.3	16	6.64	46	57.8	12	5.20	30	57.4	2
30.6	42.10	28	59.9	2	26.18	25	22.3	20	7.07	43	59.2	14	5.48	28	57.6	2
May 10.6	42.35	25	60.1	2	26.40	22	24.6	23	7.45	38	60.8	16	5.74	26	57.7	1
20.6	42.58	23	60.2	1	26.59	19	27.1	25	7.79	34	62.5	17	5.97	23	57.8	1
30.5	42.78	20	60.4	2	26.74	15	29.7	26	8.08	29	64.3	18	6.17	20	57.9	1
June 9.5	42.94	16	60.6	2	26.85	11	32.4	27	8.31	23	66.2	19	6.34	17	58.0	1
19.5	43.07	13	60.8	2	26.92	7	35.1	27	8.48	17	68.1	19	6.47	13	58.1	1
29.5	43.15	8	61.0	2	26.95	3	37.7	26	8.58	10	70.0	19	6.56	9	58.3	2
July 9.4	43.19	4	61.2	2	26.93	2	40.1	24	8.62	4	71.8	18	6.60	4	58.5	2
19.4	43.19	0	61.4	2	26.87	6	42.3	22	8.59	3	73.5	17	6.60	0	58.6	1
29.4	43.15	4	61.6	2	26.77	10	44.2	19	8.49	10	75.0	15	6.56	4	58.8	2
Aug. 8.3	43.07	8	61.8	2	26.63	14	45.8	16	8.33	16	76.2	12	6.49	7	59.0	2
18.3	42.95	12	61.9	1	26.46	17	47.0	12	8.12	21	77.2	10	6.38	11	59.1	1
28.3	42.81	14	61.9	0	26.27	19	47.8	8	7.87	25	77.9	7	6.24	14	59.1	0
Sept. 7.3	42.65	16	61.9	0	26.06	21	48.2	4	7.59	28	78.2	3	6.08	16	59.1	0
17.2	42.48	17	61.8	1	25.83	23	48.2	0	7.29	30	78.2	0	5.91	17	59.0	1
27.2	42.31	17	61.6	2	25.61	22	47.8	4	6.99	30	77.8	4	5.74	17	58.8	2
Oct. 7.2	42.15	16	61.3	3	25.40	21	47.0	8	6.72	27	77.0	8	5.58	16	58.6	2
17.1	42.01	14	61.0	3	25.21	19	45.7	13	6.48	24	75.9	11	5.44	14	58.3	3
27.1	41.90	11	60.6	4	25.05	16	44.0	17	6.29	19	74.5	14	5.33	11	58.0	3
Nov. 6.1	41.83	7	60.3	3	24.92	13	42.0	20	6.16	13	72.8	17	5.26	7	57.7	3
16.1	41.81	2	60.0	3	24.84	8	39.6	24	6.10	6	70.9	19	5.24	2	57.4	3
26.0	41.85	4	59.8	2	24.82	2	36.9	27	6.12	2	69.0	19	5.27	3	57.2	2
Dec. 6.0	41.94	9	59.6	2	24.85	3	34.0	29	6.22	10	67.1	19	5.35	8	57.1	1
16.0	42.08	14	59.5	1	24.93	8	30.9	31	6.41	19	65.2	19	5.48	13	57.1	0
26.0	42.27	19	59.6	1	25.06	13	27.8	31	6.67	26	63.4	18	5.66	18	57.2	1
35.9	42.50	23	59.8	2	25.24	18	24.7	31	7.01	34	61.8	16	5.89	23	57.4	2
Sec δ, Tan δ	1.102		−0.465		1.187		+0.639		1.764		−1.452		1.096		−0.447	
Mean Place	39ˢ.893		48″.96		24ˢ.194		44″.26		3ˢ.901		55″.15		3ˢ.304		46″.61	
D′ψ α, Dω α	+0.01		−0.01		−0.02		+0.01		+0.04		−0.02		+0.01		−0.01	
Dψ δ Dω δ	−0.1		−1.0		−0.1		−1.0		−0.1		−1.0		−0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	σ Ophiuchi. Mag. 4.4				δ Aræ. Mag. 3.8				α Aræ. Mag. 3.0				λ Herculis. Mag. 4.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 17 22		° ′ + 4 12		h m 17 23		° ′ −60 36		h m 17 25		° ′ −49 48		h m 17 27		° ′ +26 10	
	s		″		s		″		s		″		s		″	
Jan. 0.9	10.47	21	44.7	19	11.45	41	49.1	17	4.59	33	34.1	12	11.84	20	19.6	28
10.9	10.68	25	42.8	18	11.86	47	47.4	15	4.92	37	32.9	10	12.04	24	16.8	26
20.9	10.93	27	41.0	16	12.33	52	45.9	11	5.29	41	31.9	7	12.28	26	14.2	24
30.9	11.20	29	39.4	14	12.85	56	44.8	8	5.70	44	31.2	5	12.54	29	11.8	20
Feb. 9.8	11.49	30	38.0	12	13.41	58	44.0	5	6.14	46	30.7	2	12.83	31	9.8	16
19.8	11.79	30	36.8	8	13.99	60	43.5	2	6.60	47	30.5	0	13.14	32	8.2	11
Mar. 1.8	12.09	30	36.0	5	14.59	60	43.3	2	7.07	47	30.5	2	13.46	32	7.1	6
11.8	12.39	30	35.5	2	15.19	60	43.5	5	7.54	46	30.7	4	13.78	31	6.5	0
21.7	12.69	29	35.3	2	15.79	58	44.0	7	8.00	45	31.1	6	14.09	30	6.5	5
31.7	12.98	28	35.5	5	16.37	56	44.7	10	8.45	44	31.7	8	14.39	30	7.0	9
Apr. 10.7	13.26	27	36.0	8	16.93	53	45.7	13	8.89	42	32.5	9	14.69	28	7.9	14
20.6	13.53	25	36.8	10	17.46	49	47.0	15	9.31	39	33.4	11	14.97	25	9.3	18
30.6	13.78	22	37.8	13	17.95	44	48.5	17	9.70	35	34.5	13	15.22	23	11.1	21
May 10.6	14.00	20	39.1	14	18.39	39	50.2	19	10.05	32	35.8	14	15.45	20	13.2	23
20.6	14.20	17	40.5	15	18.78	33	52.1	20	10.37	27	37.2	15	15.65	16	15.5	25
30.5	14.37	14	42.0	15	19.11	26	54.1	21	10.64	22	38.7	15	15.81	12	18.0	26
June 9.5	14.51	11	43.5	15	19.37	19	56.2	22	10.86	17	40.2	16	15.93	9	20.6	25
19.5	14.62	7	45.0	14	19.56	11	58.4	21	11.03	11	41.8	16	16.02	5	23.1	24
29.5	14.69	3	46.4	13	19.67	4	60.5	20	11.14	5	43.4	16	16.07	1	25.5	23
July 9.4	14.72	1	47.7	12	19.71	4	62.5	19	11.19	1	45.0	15	16.08	4	27.8	21
19.4	14.71	5	48.9	11	19.67	12	64.4	18	11.18	7	46.5	13	16.04	8	29.9	18
29.4	14.66	8	50.0	9	19.55	18	66.2	15	11.11	12	47.8	11	15.96	12	31.7	16
Aug. 8.3	14.58	11	50.9	7	19.37	25	67.7	12	10.99	17	48.9	9	15.84	14	33.3	12
18.3	14.47	14	51.6	5	19.12	30	68.9	8	10.82	21	49.8	6	15.70	17	34.5	9
28.3	14.33	16	52.1	3	18.82	33	69.7	4	10.61	24	50.4	3	15.53	19	35.4	5
Sept. 7.3	14.17	16	52.4	1	18.49	35	70.1	1	10.37	26	50.7	0	15.34	20	35.9	1
17.2	14.01	16	52.5	1	18.14	35	70.2	4	10.11	26	50.7	3	15.14	21	36.0	3
27.2	13.85	16	52.4	3	17.79	33	69.8	8	9.85	24	50.4	7	14.93	20	35.7	6
Oct. 7.2	13.69	14	52.1	5	17.46	29	69.0	12	9.61	21	49.7	9	14.73	18	35.1	10
17.2	13.55	11	51.6	7	17.17	24	67.8	16	9.40	17	48.8	12	14.55	15	34.1	14
27.1	13.44	8	50.9	10	16.93	17	66.2	18	9.23	12	47.6	14	14.40	11	32.7	17
Nov. 6.1	13.36	3	49.9	12	16.76	9	64.4	20	9.11	5	46.2	16	14.29	7	31.0	21
16.1	13.33	1	48.7	14	16.67	0	62.4	21	9.06	2	44.6	16	14.22	2	28.9	24
26.0	13.34	6	47.3	15	16.67	10	60.3	22	9.08	9	43.0	16	14.20	3	26.5	26
Dec. 6.0	13.40	11	45.8	17	16.77	19	58.1	22	9.17	16	41.4	16	14.23	8	23.9	27
16.0	13.51	15	44.1	18	16.96	28	55.9	21	9.33	23	39.8	15	14.31	13	21.2	28
26.0	13.66	20	42.3	18	17.24	37	53.8	18	9.56	30	38.3	13	14.44	17	18.4	29
35.9	13.86		40.5		17.61		52.0		9.86		37.0		14.61		15.5	
Sec δ, Tan δ	1.003		+0.074		2.038		−1.776		1.550		−1.184		1.114		+0.491	
Mean Place	$11^{s}.850$		$54''.99$		$14^{s}.415$		$45''.83$		$6^{s}.842$		$29''.77$		$13^{s}.326$		$32''.09$	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	0.00		0.00		+0.05		−0.02		+0.03		−0.01		−0.01		0.00	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.1		−1.0		−0.1		−1.0		−0.1		−1.0		−0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	λ Scorpii. Mag. 1.7				β Draconis. Mag. 3.0				α Ophiuchi. Mag. 2.1				ξ Serpentis. Mag. 3.6			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	17 27		−37 2		17 28		+52 21		17 30		+12 36		17 32		−15 20	
	s		″		s		″		s		″		s		″	
Jan. 0.9	40.13	27	34.1	5	25.91	20	41.2	35	52.31	20	70.1	22	34.72	23	48.5	7
10.9	40.40	31	33.6	4	26.11	27	37.7	32	52.51	24	67.9	22	34.95	26	49.2	8
20.9	40.71	34	33.2	2	26.38	32	34.5	29	52.75	26	65.7	20	35.21	28	50.0	8
30.9	41.05	37	33.0	1	26.70	36	31.6	24	53.01	28	63.7	17	35.49	30	50.8	7
Feb. 9.8	41.42	38	32.9	1	27.06	39	29.2	18	53.29	30	62.0	13	35.79	31	51.5	6
19.8	41.80	39	33.0	2	27.45	41	27.4	12	53.59	30	60.7	9	36.10	32	52.1	5
Mar. 1.8	42.19	39	33.2	3	27.86	42	26.2	6	53.89	30	59.8	6	36.42	33	52.6	4
11.8	42.58	38	33.5	3	28.28	42	25.6	1	54.19	30	59.2	2	36.75	32	53.0	2
21.7	42.96	37	33.8	4	28.70	40	25.7	7	54.49	30	59.0	3	37.07	31	53.2	1
31.7	43.33	36	34.2	5	29.10	38	26.4	13	54.79	29	59.3	7	37.38	30	53.3	0
Apr. 10.7	43.69	35	34.7	5	29.48	35	27.7	19	55.08	27	60.0	11	37.68	29	53.3	2
20.6	44.04	32	35.2	6	29.83	31	29.6	23	55.35	25	61.1	13	37.97	27	53.1	3
30.6	44.36	30	35.8	7	30.14	26	31.9	27	55.60	23	62.4	16	38.24	25	52.8	4
May 10.6	44.66	27	36.5	7	30.40	22	34.6	30	55.83	20	64.0	18	38.49	23	52.4	4
20.6	44.93	24	37.2	8	30.62	17	37.6	32	56.03	17	65.8	19	38.72	20	52.0	5
30.5	45.17	19	38.0	8	30.79	11	40.8	32	56.20	14	67.7	19	38.92	17	51.5	4
June 9.5	45.36	15	38.8	9	30.90	4	44.0	32	56.34	10	69.6	19	39.09	13	51.1	4
19.5	45.51	10	39.7	9	30.94	2	47.2	31	56.44	7	71.5	19	39.22	10	50.7	4
29.5	45.61	6	40.6	9	30.92	7	50.3	29	56.51	3	73.4	18	39.32	5	50.3	4
July 9.4	45.67	1	41.5	8	30.85	13	53.2	27	56.54	1	75.2	16	39.37	1	49.9	3
19.4	45.68	4	42.3	7	30.72	18	55.9	24	56.53	5	76.8	14	39.38	3	49.6	2
29.4	45.64	9	43.0	7	30.54	23	58.3	20	56.48	9	78.2	12	39.35	6	49.4	2
Aug. 8.3	45.55	13	43.7	5	30.31	28	60.3	15	56.39	12	79.4	9	39.29	10	49.2	1
18.3	45.42	16	44.2	4	30.03	31	61.8	11	56.27	14	80.3	7	39.19	13	49.1	1
28.3	45.26	18	44.6	2	29.72	33	62.9	6	56.13	16	81.0	4	39.06	15	49.0	1
Sept. 7.3	45.08	20	44.8	0	29.39	35	63.5	1	55.97	17	81.4	2	38.91	16	48.9	1
17.2	44.88	20	44.8	3	29.04	35	63.6	4	55.80	18	81.6	1	38.75	17	48.8	1
27.2	44.68	19	44.5	4	28.69	34	63.2	9	55.62	17	81.5	4	38.58	16	48.7	0
Oct. 7.2	44.49	16	44.1	6	28.35	31	62.3	14	55.45	15	81.1	7	38.42	14	48.7	0
17.2	44.33	13	43.5	7	28.04	28	60.9	18	55.30	12	80.4	10	38.28	11	48.7	0
27.1	44.20	9	42.8	9	27.76	23	59.1	23	55.18	9	79.4	13	38.17	8	48.7	1
Nov. 6.1	44.11	4	41.9	9	27.53	18	56.8	28	55.09	5	78.1	15	38.09	3	48.8	2
16.1	44.07	2	41.0	10	27.35	12	54.0	31	55.04	1	76.6	18	38.06	2	49.0	2
26.0	44.09	8	40.0	9	27.23	4	50.9	33	55.03	4	74.8	20	38.08	7	49.2	4
Dec. 6.0	44.17	14	39.1	9	27.19	3	47.6	35	55.07	9	72.8	21	38.15	11	49.6	5
16.0	44.31	20	38.2	7	27.22	10	44.1	36	55.16	14	70.7	22	38.26	16	50.1	6
26.0	44.51	25	37.5	6	27.32	16	40.5	35	55.30	18	68.5	22	38.42	20	50.7	7
35.9	44.76		36.9		27.48		37.0		55.48		66.3		38.62		51.4	
Sec δ, Tan δ	1.253		−0.755		1.638		+1.297		1.025		+0.224		1.037		−0.274	
Mean Place	41ˢ.949		28″.28		27ˢ.976		55″.41		53ˢ.722		81″.20		36ˢ.210		40″.23	
D′ψ α, Dω α	+0.02		−0.01		−0.03		+0.01		−0.01		0.00		+0.01		0.00	
Dψ δ, Dω δ	−0.1		−1.0		−0.1		−1.0		−0.1		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ι Herculis. Mag. 3.8				η Pavonis. Mag. 3.6				ω Draconis. Mag. 4.9				β Ophiuchi. Mag. 2.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	17 36		+46 2		17 37		−64 40		17 37		+68 47		17 39		+ 4 35.	
	s		″		s		″		s		″		s		″	
Jan. 1.0	58.66		54.4		8.01		65.0		24.09		39.6		9.05		60.0	
10.9	58.85	19	51.0	34	8.43	42	63.0	20	24.31	22	36.0	36	9.25	20	58.2	18
20.9	59.10	25	47.8	32	8.94	51	61.2	18	24.65	34	32.7	33	9.48	23	56.5	17
30.9	59.39	29	45.0	28	9.51	57	59.7	15	25.08	43	29.7	30	9.74	26	54.9	16
Feb. 9.8	59.71	32	42.6	24	10.12	61	58.6	11	25.59	51	27.2	25	10.02	28	53.5	14
19.8	60.06	35	40.7	19	10.77	65	57.8	8	26.16	57	25.3	19	10.31	29	52.3	12
Mar. 1.8	60.43	37	39.4	13	11.44	67	57.4	4	26.78	62	24.0	13	10.61	30	51.5	8
11.8	60.80	37	38.7	7	12.12	68	57.3	1	27.42	64	23.4	6	10.91	30	51.0	5
21.7	61.18	38	38.7	0	12.80	68	57.5	2	28.07	65	23.4	0	11.21	30	50.9	1
31.7	61.55	37	39.3	6	13.47	67	58.1	6	28.70	63	24.1	7	11.50	29	51.1	2
Apr. 10.7	61.90	35	40.5	12	14.12	65	59.0	9	29.29	59	25.4	13	11.79	29	51.6	5
20.7	62.23	33	42.2	17	14.73	61	60.2	12	29.83	54	27.3	19	12.07	28	52.4	8
30.6	62.53	30	44.4	22	15.30	57	61.6	14	30.30	47	29.7	24	12.33	26	53.5	11
May 10.6	62.79	26	47.0	26	15.82	52	63.3	17	30.69	39	32.4	27	12.56	23	54.8	13
20.6	63.01	22	49.9	29	16.28	46	65.2	19	30.99	30	35.5	31	12.77	21	56.3	15
30.5	63.18	17	53.0	31	16.68	40	67.3	21	31.20	21	38.8	33	12.96	19	57.8	15
June 9.5	63.30	12	56.1	31	17.00	32	69.5	22	31.30	10	42.2	34	13.12	16	59.4	16
19.5	63.37	7	59.2	31	17.23	23	71.8	23	31.30	0	45.5	33	13.24	12	61.0	16
29.5	63.39	2	62.3	31	17.38	15	74.1	23	31.20	10	48.8	33	13.32	8	62.5	15
July 9.4	63.36	3	65.2	29	17.44	6	76.4	23	31.00	20	51.9	31	13.36	4	63.9	14
19.4	63.27	9	67.8	26	17.41	3	78.5	21	30.70	30	54.7	28	13.36	0	65.2	13
29.4	63.13	14	70.2	24	17.29	12	80.4	19	30.31	39	57.2	25	13.33	3	66.3	11
Aug. 8.4	62.95	18	72.2	20	17.09	20	82.1	17	29.85	46	59.4	22	13.26	7	67.2	9
18.3	62.73	22	73.8	16	16.81	28	83.5	14	29.32	53	61.1	17	13.15	11	68.0	8
28.3	62.47	26	75.0	12	16.47	34	84.6	11	28.74	58	62.3	12	13.02	13	68.6	6
Sept. 7.3	62.19	28	75.7	7	16.09	38	85.3	7	28.12	62	63.0	7	12.87	15	69.0	4
17.2	61.90	29	75.9	2	15.68	41	85.5	2	27.48	64	63.2	2	12.71	16	69.2	2
27.2	61.60	30	75.6	3	15.27	41	85.2	3	26.83	65	62.9	3	12.54	17	69.2	0
Oct. 7.2	61.31	29	74.9	7	14.87	40	84.5	7	26.20	63	62.1	8	12.38	16	68.9	3
17.2	61.04	27	73.7	12	14.51	36	83.4	11	25.60	60	60.8	13	12.23	15	68.4	5
27.1	60.80	24	72.0	17	14.21	30	81.9	15	25.04	56	58.9	19	12.11	12	67.7	7
Nov. 6.1	60.60	20	69.8	22	13.98	23	80.0	19	24.55	49	56.6	23	12.02	9	66.8	9
16.1	60.45	15	67.3	25	13.84	14	77.9	21	24.15	40	53.8	28	11.97	5	65.7	11
26.1	60.36	9	64.4	29	13.80	4	75.6	23	23.85	30	50.7	31	11.97	0	64.4	13
Dec. 6.0	60.33	3	61.2	32	13.87	7	73.2	24	23.65	20	47.3	34	12.01	4	62.9	15
16.0	60.36	3	57.8	34	14.05	18	70.8	24	23.57	8	43.7	36	12.10	9	61.2	17
26.0	60.45	9	54.4	34	14.33	28	68.5	23	23.61	4	40.1	36	12.24	14	59.4	18
35.9	60.61	16	51.0	34	14.70	37	66.4	21	23.76	15	36.5	36	12.42	18	57.6	18
Sec δ, Tan δ	1.441		+1.037		2.339		−2.114		2.765		+2.578		1.003		+0.080	
Mean Place	$60^{s}.552$		$67''.81$		$11^{s}.394$		$60''.84$		$27^{s}.557$		$53''.62$		$10^{s}.462$		$70''.42$	
D′ψ α, Dω α	−0.03		+0.01		+0.05		−0.01		−0.07		+0.02		0.00		0.00	
Dψ δ, Dω δ	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ι^1 Scorpii. Mag. 3.1				μ Herculis. Mag. 3.5				ψ Draconis. Mag. 4.9				γ Ophiuchi. Mag. 3.7			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	17 41		−40 5		17 43		+27 45		17 43		+72 11		17 43		+ 2 44	
	s		″		s		″		s		″		s		″	
Jan. 1.0	28.07	27	45.6	8	1.64	18	63.2	29	24.80	22	17.0	36	30.36	20	11.2	17
10.9	28.34	31	44.8	6	1.82	22	60.3	27	25.02	36	13.4	34	30.56	23	9.5	17
20.9	28.65	34	44.2	5	2.04	25	57.6	24	25.38	47	10.0	30	30.79	25	7.8	15
30.9	28.99	37	43.7	3	2.29	28	55.2	21	25.85	57	7.0	25	31.04	28	6.3	13
Feb. 9.9	29.36	39	43.4	2	2.57	30	53.1	17	26.42	65	4.5	20	31.32	29	5.0	11
19.8	29.75	40	43.2	1	2.87	31	51.4	12	27.07	71	2.5	14	31.61	30	3.9	8
Mar. 1.8	30.15	40	43.1	1	3.18	32	50.2	7	27.78	74	1.1	7	31.91	30	3.1	5
11.8	30.55	40	43.2	2	3.50	82	49.5	2	28.52	75	0.4	1	32.21	30	2.6	2
21.7	30.95	39	43.4	3	3.82	31	49.3	4	29.27	73	0.3	6	32.51	30	2.4	2
31.7	31.34	38	43.7	4	4.13	30	49.7	9	30.00	69	0.9	13	32.81	29	2.6	5
Apr. 10.7	31.72	37	44.1	5	4.43	29	50.6	14	30.69	63	2.2	18	33.10	28	3.1	8
20.7	32.09	35	44.6	6	4.72	27	52.0	18	31.32	55	4.0	23	33.38	26	3.9	10
30.6	32.44	32	45.2	7	4.99	24	53.8	21	31.87	46	6.3	27	33.64	24	4.9	12
May 10.6	32.76	29	45.9	8	5.23	21	55.9	23	32.33	35	9.0	30	33.88	22	6.1	14
20.6	33.05	26	46.7	9	5.44	18	58.2	25	32.68	24	12.0	32	34.10	19	7.5	15
30.5	33.31	22	47.6	9	5.62	14	60.7	26	32.92	12	15.2	34	34.29	16	9.0	15
June 9.5	33.53	17	48.5	10	5.76	10	63.3	26	33.04	1	18.6	34	34.45	12	10.5	15
19.5	33.70	12	49.5	10	5.86	6	65.9	26	33.03	13	22.0	33	34.57	9	12.0	14
29.5	33.82	7	50.5	10	5.92	1	68.5	24	32.90	24	25.3	31	34.66	5	13.4	13
July 9.4	33.89	2	51.5	10	5.93	3	70.9	22	32.66	36	28.4	28	34.71	1	14.7	12
19.4	33.91	3	52.5	10	5.90	7	73.1	19	32.30	46	31.2	25	34.72	3	15.9	10
29.4	33.88	8	53.5	9	5.83	11	75.0	17	31.84	56	33.7	22	34.69	7	16.9	9
Aug. 8.4	33.80	13	54.4	7	5.72	14	76.7	14	31.28	63	35.9	18	34.62	10	17.8	7
18.3	33.67	16	55.1	5	5.58	17	78.1	10	30.65	70	37.7	13	34.52	13	18.5	6
28.3	33.51	19	55.6	3	5.41	19	79.1	6	29.95	75	39.0	8	34.39	15	19.1	4
Sept. 7.3	33.32	21	55.9	1	5.22	21	79.7	3	29.20	77	39.8	3	34.24	16	19.5	2
17.2	33.11	21	56.0	1	5.01	21	80.0	1	28.43	78	40.1	2	34.08	17	19.7	1
27.2	32.90	20	55.9	4	4.80	20	79.9	5	27.65	77	39.9	8	33.91	16	19.6	2
Oct. 7.2	32.70	18	55.5	6	4.60	19	79.4	10	26.88	74	39.1	13	33.75	14	19.4	4
17.2	32.52	15	54.9	8	4.41	17	78.4	13	26.14	68	37.8	18	33.61	12	19.0	6
27.1	32.37	11	54.1	10	4.24	13	77.1	17	25.46	60	36.0	23	33.49	9	18.4	9
Nov. 6.1	32.26	6	53.1	10	4.11	9	75.4	21	24.86	51	33.7	27	33.40	5	17.5	10
16.1	32.20	1	52.1	11	4.02	4	73.3	23	24.35	40	31.0	30	33.35	1	16.5	12
26.1	32.21	7	51.0	11	3.98	1	71.0	26	23.95	28	28.0	33	33.34	4	15.3	14
Dec. 6.0	32.28	13	49.9	11	3.99	6	68.4	28	23.67	14	24.7	36	33.38	9	13.9	16
16.0	32.41	18	48.8	10	4.05	11	65.6	29	23.53	0	21.1	37	33.47	13	12.3	16
26.0	32.59	24	47.8	8	4.16	15	62.7	29	23.53	14	17.4	36	33.60	18	10.7	17
35.9	32.83		47.0		4.31		59.8		23.67		13.8		33.78		9.0	
Sec δ, Tan δ	1.307		−0.842		1.130		+0.527		3.269		+3.113		1.001		+0.048	
Mean Place	$29^s.973$		$39''.28$		$3^s.184$		$75''.32$		$28^s.955$		$30''.54$		$31^s.784$		$21''.39$	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	+0.02		0.00		−0.01		0.00		−0.08		+0.01		0.00		0.00	
$D_\psi\,\delta$, $D_\omega\,\delta$	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**89 Herculis.** Mag. 5.5				*ξ* **Draconis.** Mag. 3.9				*θ* **Herculis.** Mag. 4.0				**35 Draconis.** Mag. 5.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 17 51		° ′ +26 3		h m 17 51		° ′ +56 52		h m 17 53		° ′ +37 15		h m 17 53		° ′ +76 58	
	s		″		s		″		s		″		s		″	
Jan. 1.0	53.08		35.9		59.09		56.9		14.42		29.1		14.80		17.3	
10.9	53.25	17	33.1	28	59.27	18	53.3	36	14.59	17	25.9	32	15.02	22	13.8	35
20.9	53.46	21	30.4	27	59.51	24	50.0	33	14.81	22	22.9	30	15.42	40	10.5	33
30.9	53.71	25	28.0	24	59.81	30	47.0	30	15.06	25	20.2	27	15.98	56	7.5	30
Feb. 9.9	53.98	27	25.9	21	60.17	36	44.4	26	15.34	28	17.8	24	16.69	71	4.9	26
19.8	54.27	29	24.2	17	60.57	40	42.3	21	15.65	31	15.9	19	17.52	83	2.8	21
Mar. 1.8	54.58	31	23.0	12	61.00	43	40.8	15	15.98	33	14.6	13	18.43	91	1.3	15
11.8	54.89	31	22.3	7	61.45	45	40.0	8	16.32	34	13.8	8	19.40	97	0.5	8
21.7	55.21	32	22.2	1	61.91	46	39.8	2	16.66	34	13.6	2	20.39	99	0.3	2
31.7	55.52	31	22.6	4	62.36	45	40.3	5	17.00	34	14.0	4	21.36	97	0.8	5
Apr. 10.7	55.82	30	23.5	9	62.79	43	41.4	11	17.33	33	15.0	10	22.28	92	1.9	11
20.7	56.11	29	24.8	13	63.19	40	43.1	17	17.64	31	16.5	15	23.13	85	3.6	17
30.6	56.38	27	26.5	17	63.55	36	45.3	22	17.92	28	18.5	20	23.87	74	5.8	22
May 10.6	56.63	25	28.5	20	63.87	32	48.0	27	18.18	26	20.9	24	24.49	62	8.5	27
20.6	56.85	22	30.8	23	64.14	27	51.0	30	18.41	23	23.5	26	24.96	47	11.5	30
30.6	57.04	19	33.3	25	64.34	20	54.2	32	18.60	19	26.3	28	25.28	32	14.7	32
June 9.5	57.19	15	35.9	26	64.48	14	57.5	33	18.75	15	29.2	29	25.43	15	18.0	33
19.5	57.30	11	38.5	26	64.55	7	60.8	33	18.85	10	32.2	30	25.41	2	21.3	33
29.5	57.37	7	41.0	25	64.55	0	64.1	33	18.90	5	35.1	29	25.23	18	24.6	33
July 9.4	57.40	3	43.4	24	64.49	6	67.3	32	18.91	1	37.9	28	24.89	34	27.8	32
19.4	57.38	2	45.6	22	64.36	13	70.2	29	18.87	4	40.5	26	24.39	50	30.7	29
29.4	57.32	6	47.6	20	64.17	19	72.8	26	18.78	9	42.8	23	23.75	64	33.3	26
Aug. 8.4	57.23	9	49.4	18	63.92	25	75.1	23	18.65	13	44.8	20	22.99	76	35.6	23
18.3	57.10	13	50.8	14	63.62	30	77.0	19	18.48	17	46.4	16	22.12	87	37.5	19
28.3	56.94	16	51.9	11	63.28	34	78.4	14	18.28	20	47.7	13	21.16	96	38.9	14
Sept. 7.3	56.75	19	52.6	7	62.90	38	79.4	10	18.06	22	48.6	9	20.13	103	39.9	10
17.3	56.55	20	52.9	3	62.50	40	79.8	4	17.82	24	49.0	4	19.05	108	40.4	5
27.2	56.34	21	52.9	0	62.10	40	79.7	1	17.57	25	49.0	0	17.96	109	40.3	1
Oct. 7.2	56.14	20	52.5	4	61.71	39	79.1	6	17.33	24	48.5	5	16.88	108	39.7	6
17.2	55.95	19	51.7	8	61.33	38	78.0	11	17.10	23	47.5	10	15.84	104	38.6	11
27.1	55.79	16	50.5	12	60.98	35	76.4	16	16.90	20	46.1	14	14.86	98	37.0	16
Nov. 6.1	55.66	13	48.9	16	60.68	30	74.3	21	16.73	17	44.3	18	13.98	88	34.9	21
16.1	55.57	9	47.0	19	60.44	24	71.8	25	16.61	12	42.1	22	13.22	76	32.4	25
26.1	55.52	5	44.8	22	60.26	18	68.9	29	16.53	8	39.6	25	12.60	62	29.5	29
Dec. 6.0	55.52	0	42.4	24	60.15	11	65.6	33	16.50	3	36.8	28	12.14	46	26.3	32
16.0	55.58	6	39.7	27	60.12	3	62.1	35	16.53	3	33.7	31	11.86	28	22.8	35
26.0	55.68	10	36.9	28	60.17	5	58.5	36	16.62	9	30.5	32	11.77	9	19.2	36
36.0	55.83	15	34.1	28	60.30	13	55.0	35	16.76	14	27.3	32	11.87	10	15.7	35
Sec δ, Tan δ	1.113		+0.489		1.830		+1.533		1.256		+0.761		4.436		+4.322	
Mean Place	54ˢ.627		47″.53		61ˢ.532		69″.71		16ˢ.149		41″.23		20ˢ.560		30″.10	
D′ψ α, Dω α	−0.01		0.00		−0.04		0.00		−0.02		0.00		−0.11		+0.01	
Dψ δ, Dω δ	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

Mean Solar Date.	ν Ophiuchi. Mag. 3.5				ξ Herculis. Mag. 3.8				γ Draconis. Mag. 2.4				67 Ophiuchi. Mag. 3.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	17 54		− 9 45		17 54		+29 14		17 54		+51 29		17 56		+ 2 55	
	s		″		s		″		s		″		s		″	
Jan. 1.0	12.72		58.8		21.45		72.2		32.97		42.8		15.84		55.8	
10.9	12.92	20	59.8	10	21.62	17	69.3	29	33.14	17	39.3	35	16.03	19	54.1	17
20.9	13.15	23	60.7	9	21.83	21	66.5	28	33.37	23	36.0	33	16.25	22	52.5	16
30.9	13.41	26	61.6	9	22.08	25	64.0	25	33.65	28	33.0	30	16.49	24	51.0	15
Feb. 9.9	13.69	28	62.4	8	22.35	27	61.8	22	33.98	33	30.4	26	16.76	27	49.7	13
19.8	13.99	30	63.1	7	22.65	30	60.1	17	34.34	36	28.3	21	17.05	29	48.6	11
Mar. 1.8	14.29	30	63.7	6	22.96	31	58.8	13	34.73	39	26.8	15	17.34	29	47.8	8
11.8	14.60	31	64.0	3	23.28	32	58.0	8	35.13	40	26.0	8	17.64	30	47.3	5
21.7	14.91	31	64.1	1	23.60	32	57.8	2	35.54	41	25.8	2	17.94	30	47.2	1
31.7	15.22	31	64.0	1	23.92	32	58.2	4	35.94	40	26.3	5	18.24	30	47.4	2
Apr. 10.7	15.52	30	63.7	3	24.23	31	59.1	9	36.33	39	27.4	11	18.53	29	47.9	5
20.7	15.81	29	63.2	5	24.53	30	60.5	14	36.70	37	29.0	16	18.81	28	48.7	8
30.6	16.09	28	62.6	6	24.80	27	62.3	18	37.04	34	31.1	21	19.08	27	49.7	10
May 10.6	16.35	26	61.9	7	25.05	25	64.4	21	37.34	30	33.7	26	19.33	25	51.0	13
20.6	16.59	24	61.1	8	25.27	22	66.8	24	37.59	25	36.6	29	19.56	23	52.4	14
30.6	16.80	21	60.3	8	25.46	19	69.4	26	37.79	20	39.7	31	19.76	20	53.9	15
June 9.5	16.98	18	59.4	9	25.61	15	72.1	27	37.93	14	43.0	33	19.93	17	55.5	16
19.5	17.13	15	58.6	8	25.72	11	74.8	27	38.01	8	46.3	33	20.07	14	57.0	15
29.5	17.24	11	57.8	8	25.79	7	77.5	27	38.04	3	49.5	32	20.17	10	58.4	14
July 9.4	17.31	7	57.1	7	25.82	3	80.0	25	38.01	3	52.6	31	20.23	6	59.8	14
19.4	17.33	2	56.5	6	25.80	2	82.4	24	37.91	10	55.5	29	20.25	2	61.1	13
29.4	17.32	1	56.0	5	25.74	6	84.5	21	37.76	15	58.1	26	20.23	2	62.2	11
Aug. 8.4	17.27	5	55.6	4	25.64	10	86.3	18	37.56	20	60.3	22	20.17	6	63.2	10
18.3	17.18	9	55.3	3	25.50	14	87.8	15	37.31	25	62.2	19	20.08	9	64.0	8
28.3	17.06	12	55.0	3	25.33	17	89.0	12	37.02	29	63.6	14	19.96	12	64.6	6
Sept. 7.3	16.92	14	54.8	2	25.13	20	89.8	8	36.70	32	64.6	10	19.81	15	65.0	4
17.3	16.76	16	54.7	1	24.92	21	90.2	4	36.37	33	65.1	5	19.65	16	65.2	2
27.2	16.60	16	54.7	0	24.71	21	90.1	1	36.03	34	65.1	0	19.48	17	65.2	0
Oct. 7.2	16.44	16	54.8	1	24.50	21	89.7	4	35.69	34	64.5	6	19.32	16	65.0	2
17.2	16.29	15	55.0	2	24.30	20	88.9	8	35.37	32	63.4	11	19.17	15	64.6	4
27.1	16.17	12	55.2	2	24.12	18	87.6	13	35.08	29	61.8	16	19.04	13	64.0	6
Nov. 6.1	16.08	9	55.5	3	23.98	14	86.0	16	34.83	25	59.8	20	18.94	10	63.2	8
16.1	16.03	5	55.9	4	23.88	10	84.0	20	34.63	20	57.4	24	18.88	6	62.2	10
26.1	16.02	1	56.5	6	23.83	5	81.7	23	34.48	15	54.6	28	18.86	2	61.0	12
Dec. 6.0	16.06	4	57.2	7	23.82	1	79.2	25	34.40	8	51.4	32	18.89	3	59.6	14
16.0	16.15	9	58.0	8	23.86	4	76.4	28	34.39	1	48.0	34	18.97	8	58.1	15
26.0	16.28	13	58.8	8	23.96	10	73.5	29	34.45	6	44.5	35	19.09	12	56.5	16
36.0	16.46	18	59.7	9	24.10	14	70.6	29	34.58	13	41.0	35	19.25	16	54.9	16
Sec δ, Tan δ	1.015		−0.172		1.146		+0.560		1.606		+1.257		1.001		+0.051	
Mean Place	$14^s.187$		49″.47		$23^s.052$		83″.90		$35^s.147$		55″.33		$17^s.282$		65″.97	
$D'_\psi\, a$, $D_\omega\, a$	0.00		0.00		−0.01		0.00		−0.03		0.00		0.00		0.00	
$D_\psi\, \delta$, $D_\omega\, \delta$	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**θ Aræ.** Mag. 3.9				**γ Sagittarii.** Mag. 3.1				**70 Ophiuchi.** Mag. 4.1				**72 Ophiuchi.** Mag. 3.7			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 17 59		° ′ −50 5		h m 18 0		° ′ −30 25		h m 18 1		° ′ + 2 30		h m 18 3		° ′ + 9 32	
	s		″		s		″		s		″		s		″	
Jan. 1.0	49.24		61.4		11.39		42.0		1.99		57.8		12.01		52.4	
10.9	49.52	28	59.9	15	11.61	22	41.7	3	2.17	18	56.1	17	12.19	18	50.4	20
20.9	49.86	34	58.6	13	11.87	26	41.5	2	2.39	22	54.5	16	12.40	21	48.5	19
30.9	50.24	38	57.5	11	12.16	29	41.3	2	2.63	24	53.0	15	12.63	23	46.7	18
Feb. 9.9	50.65	41	56.6	9	12.48	32	41.2	1	2.89	26	51.7	13	12.89	26	45.1	16
19.8	51.09	44	55.9	7	12.82	34	41.1	1	3.17	28	50.6	11	13.17	28	43.8	13
Mar. 1.8	51.54	45	55.4	5	13.17	35	41.1	0	3.47	30	49.8	8	13.46	29	42.9	9
11.8	52.00	46	55.1	3	13.53	36	41.1	0	3.77	30	49.3	5	13.76	30	42.4	5
21.8	52.47	47	55.0	1	13.89	36	41.1	0	4.07	30	49.1	2	14.06	30	42.2	2
31.7	52.94	47	55.2	2	14.24	35	41.1	0	4.37	30	49.3	2	14.36	30	42.4	2
Apr. 10.7	53.40	46	55.6	4	14.59	35	41.1	0	4.67	30	49.8	5	14.65	29	43.0	6
20.7	53.84	44	56.1	5	14.93	34	41.2	1	4.95	28	50.6	8	14.94	29	44.0	10
30.6	54.26	42	56.8	7	15.25	32	41.3	1	5.22	27	51.6	10	15.21	27	45.3	13
May 10.6	54.65	39	57.7	9	15.55	30	41.4	1	5.47	25	52.8	12	15.46	25	46.8	15
20.6	55.01	36	58.8	11	15.83	28	41.6	2	5.70	23	54.2	14	15.69	23	48.5	17
30.6	55.33	32	60.0	12	16.08	25	41.8	2	5.91	21	55.7	15	15.89	20	50.4	19
June 9.5	55.60	27	61.4	14	16.30	22	42.1	3	6.09	18	57.2	15	16.06	17	52.3	19
19.5	55.82	22	62.9	15	16.48	18	42.5	4	6.23	14	58.7	15	16.20	14	54.2	19
29.5	55.98	16	64.4	15	16.61	13	42.9	4	6.34	11	60.1	14	16.30	10	56.0	18
July 9.5	56.08	10	66.0	16	16.69	8	43.4	5	6.40	6	61.4	13	16.36	6	57.7	17
19.4	56.11	3	67.6	16	16.73	4	43.9	5	6.42	2	62.6	12	16.38	2	59.3	16
29.4	56.08	3	69.1	15	16.72	1	44.4	5	6.41	1	63.7	11	16.36	2	60.7	14
Aug. 8.4	56.00	8	70.4	13	16.67	5	44.9	5	6.36	5	64.6	9	16.30	6	62.0	13
18.3	55.86	14	71.5	11	16.58	9	45.3	4	6.27	9	65.4	8	16.20	10	63.0	10
28.3	55.67	19	72.4	9	16.45	13	45.7	4	6.15	12	66.0	6	16.07	13	63.8	8
Sept. 7.3	55.44	23	73.0	6	16.29	16	46.0	3	6.00	15	66.4	4	15.92	15	64.4	6
17.3	55.19	25	73.4	4	16.11	18	46.1	1	5.84	16	66.6	2	15.75	17	64.7	3
27.2	54.93	26	73.4	0	15.93	18	46.1	0	5.67	17	66.6	0	15.58	17	64.7	0
Oct. 7.2	54.67	26	73.1	3	15.75	18	46.0	1	5.51	16	66.3	3	15.41	17	64.5	2
17.2	54.43	24	72.4	7	15.58	17	45.7	3	5.36	15	65.9	4	15.25	16	64.0	5
27.2	54.23	20	71.5	9	15.44	14	45.3	4	5.23	13	65.3	6	15.11	14	63.3	7
Nov. 6.1	54.08	15	70.3	12	15.34	10	44.9	4	5.13	10	64.5	8	15.00	11	62.3	10
16.1	53.98	10	68.9	14	15.28	6	44.4	5	5.07	6	63.5	10	14.93	7	61.1	12
26.1	53.95	3	67.3	16	15.27	1	43.8	6	5.05	2	62.3	12	14.90	3	59.6	15
Dec. 6.0	53.99	4	65.7	16	15.31	4	43.3	5	5.08	3	61.0	13	14.92	2	57.9	17
16.0	54.10	11	64.0	17	15.40	9	42.8	5	5.15	7	59.5	15	14.98	6	56.0	19
26.0	54.28	18	62.4	16	15.55	15	42.3	5	5.26	11	57.9	16	15.09	11	54.1	19
36.0	54.53	25	60.8	16	15.75	20	41.9	4	5.42	16	56.3	16	15.24	15	52.1	20
Sec δ, Tan δ	1.559		−1.196		1.160		−0.587		1.001		+0.044		1.014		+0.168	
Mean Place	51ˢ.487		54″.59		13ˢ.074		33″.89		3ˢ.433		67″.96		13ˢ.475		62″.91	
D′ψ α, Dω α	+0.03		0.00		+0.02		0.00		0.00		0.00		0.00		0.00	
Dψ δ, Dω δ	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	o Herculis. Mag. 3.8				μ Sagittarii. Mag. 4.0				η Sagittarii. Mag. 3.2				Groombridge 2583. Mag. 5.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 18 4		° ′ +28 44		h m 18 8		° ′ −21 4		h m 18 11		° ′ −36 47		h m 18 12		° ′ +42 7	
	s		″		s		″		s		″		s		″	
Jan. 1.0	7.28		48.1		32.04		65.8		42.66		27.0		54.47		33.8	
11.0	7.44	16	45.2	29	32.24	20	66.0	2	42.88	22	26.2	8	54.61	14	30.5	33
20.9	7.64	20	42.5	27	32.48	24	66.3	3	43.15	27	25.5	7	54.81	20	27.3	32
30.9	7.88	24	40.0	25	32.74	26	66.6	3	43.45	30	25.0	5	55.05	24	24.4	29
Feb. 9.9	8.15	27	37.8	22	33.03	29	66.8	2	43.78	33	24.5	5	55.33	28	21.9	25
19.8	8.44	29	36.0	18	33.34	31	67.0	2	44.13	35	24.1	4	55.64	31	19.8	21
Mar. 1.8	8.74	30	34.7	13	33.66	32	67.1	1	44.50	37	23.8	3	55.97	33	18.3	15
11.8	9.05	31	33.9	8	33.98	32	67.2	1	44.88	38	23.6	2	56.32	35	17.3	10
21.8	9.37	32	33.7	2	34.31	33	67.2	0	45.26	38	23.4	2	56.68	36	16.9	4
31.7	9.69	32	34.0	3	34.64	33	67.1	1	45.64	38	23.3	1	57.03	35	17.2	3
Apr. 10.7	10.00	31	34.8	8	34.96	32	66.9	2	46.02	38	23.3	0	57.38	35	18.1	9
20.7	10.30	30	36.1	13	35.28	32	66.6	3	46.39	37	23.4	1	57.72	34	19.5	14
30.7	10.58	28	37.9	18	35.59	31	66.3	3	46.74	35	23.6	2	58.03	31	21.4	19
May 10.6	10.84	26	40.0	21	35.88	29	66.0	3	47.07	33	23.9	3	58.32	29	23.8	24
20.6	11.07	23	42.4	24	36.14	26	65.6	4	47.38	31	24.3	4	58.57	25	26.5	27
30.6	11.27	20	45.0	26	36.38	24	65.3	3	47.66	28	24.8	5	58.78	21	29.4	29
June 9.5	11.43	16	47.7	27	36.59	21	65.0	3	47.90	24	25.4	6	58.95	17	32.5	31
19.5	11.55	12	50.4	27	36.76	17	64.8	2	48.10	20	26.1	7	59.07	12	35.7	32
29.5	11.63	8	53.1	27	36.89	13	64.7	1	48.25	15	26.8	7	59.14	7	38.8	31
July 9.5	11.67	4	55.6	25	36.98	9	64.6	1	48.35	10	27.6	8	59.16	2	41.8	30
19.4	11.66	1	58.0	24	37.02	4	64.6	0	48.41	6	28.5	9	59.13	3	44.6	28
29.4	11.61	5	60.2	22	37.02	0	64.6	0	48.41	0	29.4	9	59.05	8	47.2	26
Aug. 8.4	11.51	10	62.1	19	36.98	4	64.7	1	48.36	5	30.2	8	58.92	13	49.5	23
18.4	11.38	13	63.7	16	36.90	8	64.8	1	48.27	9	30.9	7	58.74	18	51.4	19
28.3	11.22	16	64.9	12	36.78	12	64.9	1	48.13	14	31.5	6	58.53	21	52.9	15
Sept. 7.3	11.03	19	65.7	8	36.64	14	65.0	1	47.96	17	31.9	4	58.29	24	54.0	11
17.3	10.82	21	66.2	5	36.48	16	65.0	0	47.77	19	32.2	3	58.03	26	54.7	7
27.2	10.61	21	66.3	1	36.31	17	65.0	0	47.57	20	32.3	1	57.75	28	54.9	2
Oct. 7.2	10.40	21	66.0	3	36.14	17	65.0	0	47.37	20	32.2	1	57.48	27	54.7	2
17.2	10.20	20	65.2	8	35.98	16	65.0	0	47.18	19	31.9	3	57.22	26	53.9	8
27.2	10.02	18	64.0	12	35.85	13	64.9	1	47.02	16	31.4	5	56.98	24	52.6	13
Nov. 6.1	9.87	15	62.5	15	35.75	10	64.8	1	46.90	12	30.8	6	56.78	20	50.9	17
16.1	9.76	11	60.6	19	35.69	6	64.7	1	46.82	8	30.0	8	56.62	16	48.8	21
26.1	9.70	6	58.4	22	35.68	1	64.7	0	46.79	3	29.1	9	56.50	12	46.3	25
Dec. 6.0	9.69	1	55.9	25	35.71	3	64.7	0	46.82	3	28.2	9	56.44	6	43.5	28
16.0	9.72	3	53.2	27	35.79	8	64.7	0	46.91	9	27.3	9	56.44	0	40.4	31
26.0	9.80	8	50.4	28	35.92	13	64.8	1	47.05	14	26.4	9	56.49	5	37.2	32
36.0	9.94	14	47.5	29	36.10	18	65.0	2	47.25	20	25.6	8	56.60	11	33.9	33
Sec δ, Tan δ	1.141		+0.549		1.072		−0.386		1.248		−0.748		1.348		+0.905	
Mean Place	$8^{s}.901$		$59''.46$		$33^{s}.595$		$56''.87$		$44^{s}.457$		$18''.68$		$56^{s}.388$		$44''.99$	
D′ψ a, Dω a	−0.01		0.00		+0.01		0.00		+0.02		0.00		−0.02		0.00	
Dψ δ, Dω δ	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**36 Draconis.** Mag. 5.0				**δ Sagittarii.** Mag. 2.8				**η Serpentis.** Mag. 3.4				**ε Sagittarii.** Mag. 2.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	18 13		+64 21		18 15		−29 51		18 16		− 2 55		18 18		−34 25	
	s		″		s		″		s		″		s		″	
Jan. 1.0	20.56		52.2		23.79		66.4		46.98		29.5		22.09		44.3	
11.0	20.70	14	48.6	36	24.00	21	66.1	3	47.15	17	30.8	13	22.30	21	43.6	7
20.9	20.93	23	45.2	34	24.25	25	65.8	3	47.35	20	32.1	13	22.55	25	43.0	6
30.9	21.24	31	42.0	32	24.53	28	65.5	3	47.58	23	33.3	12	22.84	29	42.5	5
Feb. 9.9	21.63	39	39.2	28	24.83	30	65.3	2	47.84	26	34.3	10	23.16	32	42.1	4
19.8	22.08	45	36.9	23	25.15	32	65.1	2	48.12	28	35.2	9	23.50	34	41.7	4
Mar. 1.8	22.58	50	35.2	17	25.49	34	65.0	1	48.41	29	35.8	6	23.85	35	41.4	3
11.8	23.11	53	34.1	11	25.84	35	64.8	2	48.70	29	36.1	3	24.21	36	41.2	2
21.8	23.66	55	33.7	4	26.20	36	64.7	1	49.00	30	36.2	1	24.58	37	41.0	2
31.7	24.21	55	34.0	3	26.55	35	64.6	1	49.31	31	36.0	2	24.95	37	40.8	2
Apr. 10.7	24.74	53	34.9	9	26.90	35	64.4	2	49.61	30	35.6	4	25.32	37	40.7	1
20.7	25.25	51	36.4	15	27.24	34	64.3	1	49.90	29	34.9	7	25.68	36	40.7	0
30.7	25.71	46	38.5	21	27.57	33	64.2	1	50.18	28	34.0	9	26.03	35	40.8	1
May 10.6	26.11	40	41.0	25	27.89	32	64.2	0	50.45	27	32.9	11	26.36	33	40.9	1
20.6	26.45	34	43.9	29	28.18	29	64.2	0	50.69	24	31.7	12	26.66	30	41.1	2
30.6	26.72	27	47.1	32	28.44	26	64.3	1	50.91	22	30.4	13	26.94	28	41.4	3
June 9.5	26.91	19	50.4	33	28.67	23	64.5	2	51.10	19	29.1	13	27.18	24	41.8	4
19.5	27.01	10	53.8	34	28.86	19	64.8	3	51.26	16	27.9	12	27.38	20	42.3	5
29.5	27.02	1	57.2	34	29.01	15	65.2	4	51.38	12	26.7	12	27.54	16	42.9	6
July 9.5	26.94	8	60.5	33	29.11	10	65.6	4	51.46	8	25.6	11	27.65	11	43.6	7
19.4	26.78	16	63.7	32	29.17	6	66.0	4	51.51	5	24.6	10	27.71	6	44.3	7
29.4	26.54	24	66.6	29	29.18	1	66.5	5	51.51	0	23.7	9	27.72	1	45.0	7
Aug. 8.4	26.23	31	69.1	25	29.14	4	67.0	5	51.47	4	22.9	8	27.68	4	45.7	7
18.4	25.85	38	71.3	22	29.05	9	67.5	5	51.39	8	22.3	6	27.60	8	46.4	7
28.3	25.41	44	73.0	17	28.93	12	67.9	4	51.28	11	21.9	4	27.47	13	47.0	6
Sept. 7.3	24.93	48	74.3	13	28.78	15	68.2	3	51.14	14	21.6	3	27.31	16	47.5	5
17.3	24.42	51	75.1	8	28.61	17	68.4	2	50.98	16	21.4	2	27.13	18	47.8	3
27.2	23.89	53	75.4	3	28.43	18	68.5	1	50.82	16	21.4	0	26.93	20	47.9	1
Oct. 7.2	23.36	53	75.1	3	28.24	19	68.5	0	50.66	16	21.5	1	26.74	19	47.8	1
17.2	22.85	51	74.3	8	28.07	17	68.3	2	50.51	15	21.8	3	26.56	18	47.6	2
27.2	22.37	48	72.9	14	27.92	15	68.0	3	50.37	14	22.2	4	26.40	16	47.2	4
Nov. 6.1	21.93	44	71.0	19	27.81	11	67.6	4	50.26	11	22.8	6	26.28	12	46.6	6
16.1	21.56	37	68.7	23	27.74	7	67.1	5	50.19	7	23.5	7	26.20	8	46.0	6
26.1	21.26	30	66.0	27	27.72	2	66.6	5	50.16	3	24.4	9	26.17	3	45.3	7
Dec. 6.1	21.05	21	62.9	31	27.75	3	66.1	5	50.18	2	25.4	10	26.19	2	44.5	8
16.0	20.93	12	59.5	34	27.83	8	65.6	5	50.24	6	26.5	11	26.27	8	43.7	8
26.0	20.91	2	55.9	36	27.96	13	65.1	5	50.34	10	27.7	12	26.40	13	42.9	8
36.0	20.98	7	52.3	36	28.14	18	64.7	4	50.49	15	29.0	13	26.59	19	42.2	7
Sec δ, Tan δ	2.311		+2.084		1.153		−0.574		1.001		−0.051		1.212		−0.685	
Mean Place	$23^{s}.769$		$63''.52$		$25^{s}.460$		$57''.64$		$48^{s}.436$		$19''.59$		$23^{s}.829$		$35''.54$	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	−0.06		−0.01		+0.02		0.00		0.00		0.00		+0.02		0.00	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	109 Herculis. Mag. 3.9				α Telescopii. Mag. 3.8				λ Sagittarii. Mag. 2.9				χ Draconis. Mag. 3.7			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	18 19		+21 43		18 20		−46 1		18 22		−25 28		18 22		+72 41	
	s		″		s		″		s		″		s		″	
Jan. 1.0	57.85	15	35.0	25	29.31	24	11.0	14	34.50	19	24.0	1	32.96	10	32.6	36
11.0	58.00	19	32.5	25	29.55	29	9.6	12	34.69	23	23.9	1	33.06	25	29.0	35
20.9	58.19	22	30.0	23	29.84	33	8.4	11	34.92	26	23.8	0	33.31	38	25.5	32
30.9	58.41	25	27.7	20	30.17	37	7.3	10	35.18	29	23.8	0	33.69	49	22.3	29
Feb. 9.9	58.66	27	25.7	16	30.54	39	6.3	8	35.47	31	23.8	1	34.18	59	19.4	24
19.8	58.93	29	24.1	12	30.93	41	5.5	6	35.78	32	23.7	1	34.77	67	17.0	18
Mar. 1.8	59.22	30	22.9	8	31.34	43	4.9	5	36.10	33	23.6	1	35.44	73	15.2	12
11.8	59.52	30	22.1	3	31.77	43	4.4	3	36.43	34	23.5	2	36.17	76	14.0	6
21.8	59.82	31	21.8	2	32.20	44	4.1	2	36.77	35	23.3	2	36.93	77	13.4	1
31.7	60.13	31	22.0	7	32.64	43	3.9	0	37.12	34	23.1	2	37.70	75	13.5	8
Apr. 10.7	60.44	30	22.7	12	33.07	42	3.9	2	37.46	33	22.9	3	38.45	70	14.3	14
20.7	60.74	28	23.9	15	33.49	41	4.1	4	37.79	32	22.6	3	39.15	64	15.7	19
30.7	61.02	27	25.4	19	33.90	39	4.5	5	38.11	31	22.3	2	39.79	56	17.6	24
May 10.6	61.29	24	27.3	22	34.29	35	5.0	7	38.42	28	22.1	2	40.35	47	20.0	28
20.6	61.53	21	29.5	23	34.64	32	5.7	9	38.70	26	21.9	2	40.82	36	22.8	31
30.6	61.74	18	31.8	24	34.96	28	6.6	10	38.96	23	21.7	1	41.18	24	25.9	33
June 9.5	61.92	14	34.2	25	35.24	23	7.6	12	39.19	19	21.6	0	41.42	11	29.2	35
19.5	62.06	11	36.7	24	35.47	18	8.8	13	39.38	15	21.6	1	41.53	2	32.7	34
29.5	62.17	6	39.1	24	35.65	12	10.1	13	39.53	10	21.7	1	41.51	14	36.1	33
July 9.5	62.23	2	41.5	22	35.77	6	11.4	13	39.63	6	21.8	2	41.37	26	39.4	32
19.4	62.25	2	43.7	20	35.83	1	12.7	13	39.69	1	22.0	3	41.11	38	42.6	30
29.4	62.23	7	45.7	17	35.84	5	14.0	13	39.70	3	22.3	3	40.73	49	45.6	26
Aug. 8.4	62.16	11	47.4	15	35.79	11	15.3	11	39.67	7	22.6	3	40.24	58	48.2	23
18.4	62.05	14	48.9	12	35.68	16	16.4	9	39.60	11	22.9	3	39.66	66	50.5	18
28.3	61.91	16	50.1	9	35.52	19	17.3	7	39.49	14	23.2	2	39.00	73	52.3	14
Sept. 7.3	61.75	18	51.0	5	35.33	22	18.0	5	39.35	16	23.4	2	38.27	77	53.7	9
17.3	61.57	19	51.5	2	35.11	24	18.5	2	39.19	18	23.6	1	37.50	80	54.6	4
27.2	61.38	20	51.7	2	34.87	24	18.7	1	39.01	18	23.7	0	36.70	80	55.0	1
Oct. 7.2	61.18	19	51.5	5	34.63	22	18.6	4	38.83	17	23.7	1	35.90	79	54.9	6
17.2	60.99	16	51.0	9	34.41	19	18.2	7	38.66	14	23.6	1	35.11	75	54.3	12
27.2	60.83	14	50.1	13	34.22	16	17.5	9	38.52	11	23.5	2	34.36	69	53.1	17
Nov. 6.1	60.69	10	48.8	16	34.06	11	16.6	11	38.41	7	23.3	2	33.67	61	51.4	22
16.1	60.59	6	47.2	19	33.95	5	15.5	13	38.34	3	23.1	3	33.06	51	49.2	26
26.1	60.53	2	45.3	21	33.90	2	14.2	14	38.31	2	22.8	3	32.55	40	46.6	30
Dec. 6.1	60.51	3	43.2	23	33.92	8	12.8	15	38.33	7	22.5	2	32.15	27	43.6	33
16.0	60.54	8	40.9	25	34.00	14	11.3	15	38.40	12	22.3	2	31.88	13	40.3	35
26.0	60.62	12	38.4	25	34.14	21	9.8	14	38.52	16	22.1	2	31.75	2	36.8	36
36.0	60.74		35.9		34.35		8.4		38.68		21.9		31.77		33.2	
Sec δ, Tan δ	1.076		+0.399		1.440		−1.036		1.108		−0.476		3.361		+3.209	
Mean Place	59ˢ.417		45″.60		31ˢ.365		2″.63		36ˢ.101		14″.78		37ˢ.666		43″.00	
$D'_\psi \alpha$, $D_\omega \alpha$	−0.01		0.00		+0.03		+0.01		+0.01		0.00		−0.08		−0.02	
$D_\psi \delta$, $D_\omega \delta$	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*c* **Serpentis.** Mag. 5.4				**1 Aquilæ.** Mag. 4.1				**ζ Pavonis.** Mag. 4.1				**α Lyræ.** Mag. 0.1			
	Right Ascension.		**Declination S.**		**Right Ascension.**		**Declination S.**		**Right Ascension.**		**Declination S.**		**Right Ascension.**		**Declination N.**	
	h m 18 25		° ′ − 2 2		h m 18 30		° ′ − 8 18		h m 18 32		° ′ −71 30		h m 18 33		° ′ +38 41	
	s		″		s		″		s		″		s		″	
Jan. 1.0	7.85		42.4		26.89		30.4		48.08		23.5		57.69		57.6	
11.0	8.01	16	43.7	13	27.05	16	31.3	9	48.46	38	20.8	27	57.81	12	54.5	31
20.9	8.21	20	45.0	13	27.25	20	32.2	9	48.96	50	18.3	25	57.98	17	51.4	31
30.9	8.44	23	46.2	12	27.48	23	33.0	8	49.56	60	16.0	23	58.19	21	48.5	29
Feb. 9.9	8.69	25	47.2	10	27.73	25	33.8	8	50.25	69	13.9	21	58.44	25	46.0	25
19.9	8.96	27	48.1	9	28.00	27	34.4	6	51.01	76	12.1	18	58.73	29	43.9	21
Mar. 1.8	9.24	28	48.7	6	28.29	29	34.8	4	51.83	82	10.7	14	59.04	31	42.3	16
11.8	9.53	29	49.0	3	28.59	30	35.0	2	52.69	86	9.7	10	59.37	33	41.2	11
21.8	9.83	30	49.1	1	28.89	30	35.0	0	53.58	89	9.0	7	59.71	34	40.7	5
31.7	10.14	31	48.9	2	29.20	31	34.7	3	54.47	89	8.7	3	60.05	34	40.8	1
Apr. 10.7	10.44	30	48.4	5	29.51	31	34.2	5	55.35	88	8.8	1	60.39	34	41.5	7
20.7	10.74	30	47.6	8	29.82	31	33.5	7	56.22	87	9.3	5	60.72	33	42.8	13
30.7	11.02	28	46.6	10	30.11	29	32.7	8	57.05	83	10.2	9	61.04	32	44.6	18
May 10.6	11.29	27	45.5	11	30.39	28	31.8	9	57.83	78	11.4	12	61.34	30	46.8	22
20.6	11.54	25	44.2	13	30.65	26	30.8	10	58.54	71	12.9	15	61.61	27	49.3	25
30.6	11.77	23	42.8	14	30.89	24	29.8	10	59.18	64	14.7	18	61.84	23	52.1	28
June 9.6	11.97	20	41.4	14	31.10	21	28.7	11	59.72	54	16.8	21	62.03	19	55.1	30
19.5	12.14	17	40.1	13	31.28	18	27.6	11	60.16	44	19.1	23	62.18	15	58.2	31
29.5	12.27	13	38.8	13	31.42	14	26.6	10	60.48	32	21.5	24	62.28	10	61.3	31
July 9.5	12.36	9	37.6	12	31.52	10	25.8	8	60.68	20	24.0	25	62.33	5	64.3	30
19.4	12.41	5	36.5	11	31.58	6	25.1	7	60.76	8	26.5	25	62.33	0	67.2	29
29.4	12.41	0	35.5	10	31.59	1	24.4	7	60.71	5	29.0	25	62.28	5	69.9	27
Aug. 8.4	12.38	3	34.7	8	31.56	3	23.8	6	60.54	17	31.3	23	62.19	9	72.3	24
18.4	12.31	7	34.0	7	31.50	6	23.4	4	60.25	29	33.3	20	62.05	14	74.3	20
28.3	12.20	11	33.5	5	31.40	10	23.1	3	59.86	39	35.0	17	61.87	18	76.0	17
Sept. 7.3	12.07	13	33.1	4	31.27	13	22.9	2	59.39	47	36.3	13	61.66	21	77.3	13
17.3	11.92	15	32.9	2	31.12	15	22.8	1	58.86	53	37.2	9	61.42	24	78.2	9
27.3	11.76	16	32.9	0	30.96	16	22.8	0	58.29	57	37.7	5	61.17	25	78.6	4
Oct. 7.2	11.60	16	33.0	1	30.80	16	22.9	1	57.71	58	37.7	0	60.92	25	78.6	0
17.2	11.44	16	33.2	2	30.64	16	23.1	2	57.15	56	37.1	6	60.67	25	78.1	5
27.2	11.30	14	33.6	4	30.50	14	23.4	3	56.63	52	36.0	11	60.44	23	77.1	10
Nov. 6.1	11.19	11	34.2	6	30.39	11	23.8	4	56.19	44	34.4	16	60.24	20	75.7	14
16.1	11.12	7	34.9	7	30.31	8	24.2	4	55.84	35	32.5	19	60.08	16	73.9	18
26.1	11.08	4	35.8	9	30.27	4	24.8	6	55.61	23	30.2	23	59.96	12	71.7	22
Dec. 6.1	11.09	1	36.8	10	30.28	1	25.5	7	55.51	10	27.7	25	59.89	7	69.1	26
16.0	11.14	5	37.9	11	30.34	6	26.3	8	55.54	3	25.0	27	59.87	2	66.2	29
26.0	11.24	10	39.1	12	30.44	10	27.1	8	55.71	17	22.2	28	59.90	3	63.2	30
36.0	11.38	14	40.4	13	30.58	14	28.0	9	56.01	30	19.4	28	59.99	9	60.1	31
Sec δ, Tan δ	1.001		−0.036		1.011		−0.146		3.153		−2.990		1.281		+0.801	
Mean Place	9s.309		32″.45		28s.361		20″.46		52s.355		15″.08		59s.569		67″.61	
D′ψ *a*, Dω *a*	0.00		0.00		0.00		0.00		+0.08		+0.03		−0.02		−0.01	
Dψ δ, Dω δ	0.0		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**2 Aquilæ.** Mag. 4.7				**φ Sagittarii.** Mag. 3.3				**110 Herculis.** Mag. 4.3				**6 Aquilæ.** Mag. 4.5			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	18 37		− 9 8		18 40		−27 4		18 41		+20 27		18 42		− 4 50	
	s		″		s		″		s		″		s		″	
Jan. 1.0	29.20	16	21.7	8	11.66	18	61.7	3	53.42	13	34.5	25	32.04	15	40.3	11
11.0	29.36	19	22.5	8	11.84	22	61.4	3	53.55	17	32.0	24	32.19	18	41.4	10
20.9	29.55	22	23.3	8	12.06	25	61.1	3	53.72	20	29.6	22	32.37	21	42.4	10
30.9	29.77	25	24.1	7	12.31	27	60.8	2	53.92	23	27.4	20	32.58	24	43.4	9
Feb. 9.9	30.02	27	24.8	5	12.58	30	60.6	3	54.15	25	25.4	16	32.82	26	44.3	7
19.9	30.29	28	25.3	3	12.88	32	60.3	3	54.40	27	23.8	13	33.08	28	45.0	4
Mar. 1.8	30.57	30	25.6	1	13.20	33	60.0	3	54.67	29	22.5	8	33.36	29	45.4	2
11.8	30.87	31	25.7	0	13.53	34	59.7	3	54.96	30	21.7	3	33.65	30	45.6	0
21.8	31.18	31	25.7	3	13.87	35	59.4	3	55.26	31	21.4	1	33.95	30	45.6	3
31.8	31.49	31	25.4	5	14.22	34	59.1	4	55.57	31	21.5	6	34.25	31	45.3	5
Apr. 10.7	31.80	30	24.9	7	14.56	34	58.7	4	55.88	30	22.1	11	34.56	30	44.8	8
20.7	32.10	30	24.2	8	14.90	34	58.3	4	56.18	29	23.2	14	34.86	30	44.0	10
30.7	32.40	28	23.4	10	15.24	32	57.9	3	56.47	28	24.6	18	35.16	28	43.0	11
May 10.6	32.68	27	22.4	10	15.56	30	57.6	3	56.75	26	26.4	21	35.44	27	41.9	12
20.6	32.95	25	21.4	11	15.86	28	57.3	2	57.01	23	28.5	23	35.71	24	40.7	13
30.6	33.20	22	20.3	10	16.14	24	57.1	1	57.24	20	30.8	24	35.95	22	39.4	13
June 9.6	33.42	18	19.3	10	16.38	21	57.0	1	57.44	16	33.2	25	36.17	18	38.1	12
19.5	33.60	14	18.3	9	16.59	17	56.9	1	57.60	13	35.7	24	36.35	15	36.9	12
29.5	33.74	11	17.4	9	16.76	13	57.0	2	57.73	9	38.1	24	36.50	11	35.7	11
July 9.5	33.85	7	16.5	8	16.89	8	57.2	3	57.82	4	40.5	23	36.61	7	34.6	10
19.5	33.92	2	15.7	6	16.97	3	57.5	3	57.86	1	42.8	21	36.68	2	33.6	9
29.4	33.94	2	15.1	5	17.00	2	57.8	4	57.85	5	44.9	18	36.70	2	32.7	7
Aug. 8.4	33.92	6	14.6	4	16.98	6	58.2	4	57.80	8	46.7	16	36.68	6	32.0	6
18.4	33.86	10	14.2	3	16.92	10	58.6	4	57.72	12	48.3	13	36.62	10	31.4	5
28.3	33.76	12	13.9	2	16.82	14	59.0	4	57.60	15	49.6	10	36.52	12	30.9	3
Sept. 7.3	33.64	15	13.7	1	16.68	16	59.4	3	57.45	18	50.6	6	36.40	15	30.6	2
17.3	33.49	16	13.6	0	16.52	17	59.7	2	57.27	19	51.2	3	36.25	16	30.4	0
27.3	33.33	16	13.6	1	16.35	18	59.9	1	57.08	19	51.5	0	36.09	16	30.4	1
Oct. 7.2	33.17	16	13.7	2	16.17	17	60.0	0	56.89	18	51.5	4	35.93	16	30.5	2
17.2	33.01	14	13.9	3	16.00	15	60.0	2	56.71	17	51.1	7	35.77	14	30.7	3
27.2	32.87	12	14.2	3	15.85	13	59.8	2	56.54	15	50.4	10	35.63	11	31.0	5
Nov. 6.2	32.75	8	14.5	4	15.72	9	59.6	3	56.39	11	49.4	14	35.52	9	31.5	6
16.1	32.67	4	14.9	5	15.63	4	59.3	3	56.28	8	48.0	17	35.43	5	32.1	7
26.1	32.63	1	15.4	6	15.59	0	59.0	3	56.20	3	46.3	20	35.38	0	32.8	8
Dec. 6.1	32.64	5	16.0	7	15.59	5	58.7	4	56.17	1	44.3	22	35.38	4	33.6	9
16.0	32.69	9	16.7	8	15.64	10	58.3	4	56.18	6	42.1	23	35.42	8	34.5	10
26.0	32.78	13	17.5	8	15.74	15	57.9	3	56.24	10	39.8	24	35.50	13	35.5	10
36.0	32.91		18.3		15.89		57.6		56.34		37.4		35.63		36.5	
Sec δ, Tan δ	1.013		−0.161		1.123		−0.511		1.067		+0.373		1.004		−0.085	
Mean Place	30s.671		11″.73		13s.269		51″.82		55s.000		44″.28		33s.500		30″.32	
D′ψ a, Dω a	0.00		0.00		+0.01		+0.01		−0.01		0.00		0.00		0.00	
Dψ δ, Dω δ	+0.1		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**λ Pavonis.** Mag. 4.4				**β Lyræ.** Var. 3.4–4.1				**50 Draconis.** Mag. 5.4				**σ Sagittarii.** Mag. 2.1			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	18 44		−62 17		18 46		+33 15		18 49		+75 19		18 49		−26 24	
	s		″		s		″		s		″		s		″	
Jan. 1.0	6.62		27.9		50.29		30.4		5.50		45.8		50.66		31.0	
11.0	6.89	27	25.6	23	50.40	11	27.5	29	5.49	1	42.3	35	50.82	16	30.7	3
20.9	7.24	35	23.4	22	50.55	15	24.6	29	5.65	16	38.8	35	51.02	20	30.4	3
30.9	7.65	41	21.3	21	50.74	19	21.9	27	5.98	33	35.5	33	51.26	24	30.1	3
Feb. 9.9	8.13	48	19.4	19	50.97	23	19.5	24	6.45	47	32.5	30	51.53	27	29.8	3
19.9	8.66	53	17.8	16	51.23	26	17.4	21	7.05	60	29.9	26	51.82	29	29.5	3
Mar. 1.8	9.23	57	16.4	14	51.52	29	15.8	16	7.76	71	27.8	21	52.13	31	29.2	3
11.8	9.82	59	15.3	11	51.83	31	14.7	11	8.56	80	26.3	15	52.45	32	28.8	4
21.8	10.43	61	14.5	8	52.15	32	14.2	5	9.42	86	25.4	9	52.78	33	28.4	4
31.8	11.05	62	14.0	5	52.48	33	14.3	1	10.30	88	25.2	2	53.12	34	27.9	5
Apr. 10.7	11.68	63	13.8	2	52.81	33	14.9	6	11.18	88	25.6	4	53.47	35	27.4	5
20.7	12.30	62	14.0	2	53.13	32	16.0	11	12.02	84	26.7	11	53.81	34	26.9	5
30.7	12.89	59	14.5	5	53.44	31	17.6	16	12.80	78	28.3	16	54.15	34	26.5	4
May 10.6	13.45	56	15.3	8	53.74	30	19.7	21	13.50	70	30.5	22	54.48	33	26.1	4
20.6	13.98	53	16.4	11	54.01	27	22.1	24	14.10	60	33.1	26	54.78	30	25.7	4
30.6	14.46	48	17.7	13	54.25	24	24.8	27	14.58	48	36.1	30	55.06	28	25.4	3
June 9.6	14.88	42	19.3	16	54.45	20	27.6	28	14.92	34	39.3	32	55.31	25	25.2	2
19.5	15.23	35	21.1	18	54.62	17	30.5	29	15.12	20	42.7	34	55.53	22	25.1	1
29.5	15.50	27	23.1	20	54.74	12	33.5	30	15.17	5	46.2	35	55.71	18	25.1	0
July 9.5	15.69	19	25.2	21	54.81	7	36.4	29	15.08	9	49.6	34	55.84	13	25.2	1
19.5	15.79	10	27.3	21	54.84	3	39.2	28	14.84	24	52.9	33	55.93	9	25.4	2
29.4	15.80	1	29.4	21	54.82	2	41.8	26	14.46	38	56.1	32	55.97	4	25.7	3
Aug. 8.4	15.73	7	31.4	20	54.75	7	44.1	23	13.95	51	59.0	29	55.96	1	26.1	4
18.4	15.58	15	33.3	19	54.63	12	46.1	20	13.31	64	61.6	26	55.91	5	26.5	4
28.3	15.35	23	34.9	16	54.48	15	47.8	17	12.57	74	63.8	22	55.82	9	26.9	4
Sept. 7.3	15.06	29	36.2	13	54.30	18	49.1	13	11.75	82	65.6	18	55.69	13	27.2	3
17.3	14.72	34	37.1	9	54.09	21	50.0	9	10.86	89	67.0	14	55.53	16	27.5	3
27.3	14.35	37	37.6	5	53.87	22	50.5	5	9.92	94	67.9	9	55.36	17	27.8	3
Oct. 7.2	13.97	38	37.7	1	53.64	23	50.6	1	8.96	96	68.2	3	55.18	18	27.9	1
17.2	13.60	37	37.4	3	53.41	23	50.3	3	8.01	95	68.0	2	55.01	17	28.0	1
27.2	13.26	34	36.6	8	53.20	21	49.5	8	7.09	92	67.3	7	54.86	15	27.9	1
Nov. 6.2	12.97	29	35.4	12	53.02	18	48.3	12	6.22	87	66.0	13	54.73	13	27.8	1
16.1	12.74	23	33.8	16	52.87	15	46.6	17	5.42	80	64.2	18	54.63	10	27.6	2
26.1	12.59	15	31.9	19	52.76	11	44.6	20	4.72	70	62.0	22	54.58	5	27.3	3
Dec. 6.1	12.53	6	29.8	21	52.69	7	42.3	23	4.15	57	59.3	27	54.58	0	27.0	3
16.0	12.56	3	27.5	23	52.67	2	39.7	26	3.73	42	56.2	31	54.62	4	26.6	4
26.0	12.68	12	25.1	24	52.70	3	36.9	28	3.46	27	52.9	33	54.71	9	26.3	3
36.0	12.90	22	22.7	24	52.78	8	34.0	29	3.35	11	49.4	35	54.85	14	26.0	3
Sec δ, Tan δ	2.151		−1.904		1.196		+0.656		3.949		+3.820		1.116		−0.497	
Mean Place	9ˢ.523		18″.37		52ˢ.060		39″.82		11ˢ.264		53″.85		52ˢ.234		20″.71	
D′ψ α, Dω α	+0.05		+0.02		−0.02		−0.01		−0.10		−0.05		+0.01		+0.01	
Dψ δ, Dω δ	+0.1		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**o Draconis.** Mag. 4.8				**θ Serpentis *pr.*** Mag. 4.5				**R Lyræ.** Var. 4.0–4.7				**ε Aquilæ.** Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 18 49		° ′ +59 16		h m 18 51		° ′ + 4 5		h m 18 52		° ′ +43 49		h m 18 55		° ′ +14 56	
	s		″		s		″		s		″		s		″	
Jan. 1.0	52.28		45.9		52.18		12.8		39.22		42.9		38.88		48.2	
11.0	52.35	7	42.4	35	52.31	13	11.2	16	39.31	9	39.6	33	39.00	12	46.1	21
21.0	52.49	14	38.9	35	52.48	17	9.6	16	39.45	14	36.4	32	39.15	15	44.0	21
30.9	52.71	22	35.6	33	52.68	20	8.2	14	39.64	19	33.4	30	39.34	19	42.0	20
Feb. 9.9	53.00	29	32.6	30	52.90	22	7.0	12	39.88	24	30.7	27	39.56	22	40.3	17
19.9	53.35	35	30.1	25	53.15	25	6.0	10	40.16	28	28.4	23	39.81	25	38.8	15
Mar. 1.8	53.75	40	28.1	20	53.42	27	5.2	8	40.47	31	26.5	19	40.07	26	37.7	11
11.8	54.19	44	26.6	15	53.70	28	4.7	5	40.81	34	25.2	13	40.35	28	37.0	7
21.8	54.65	46	25.8	8	53.99	29	4.6	1	41.16	35	24.5	7	40.64	29	36.7	3
31.8	55.13	48	25.6	2	54.29	30	4.9	3	41.52	36	24.4	1	40.94	30	36.9	2
Apr. 10.7	55.61	48	26.1	5	54.59	30	5.5	6	41.88	36	25.0	6	41.25	31	37.5	6
20.7	56.07	46	27.3	12	54.89	30	6.4	9	42.24	36	26.1	11	41.55	30	38.5	10
30.7	56.51	44	29.0	17	55.18	29	7.6	12	42.59	35	27.8	17	41.84	29	39.8	13
May 10.7	56.91	40	31.2	22	55.46	28	9.0	14	42.91	32	29.9	21	42.12	28	41.5	17
20.6	57.27	36	33.9	27	55.73	27	10.6	16	43.20	29	32.4	25	42.39	27	43.4	19
30.6	57.57	30	36.9	30	55.98	25	12.3	17	43.46	26	35.3	29	42.63	24	45.5	21
June 9.6	57.81	24	40.2	33	56.19	21	14.0	17	43.68	22	38.4	31	42.85	22	47.7	22
19.5	57.98	17	43.6	34	56.37	18	15.8	18	43.85	17	41.6	32	43.03	18	50.0	23
29.5	58.08	10	47.1	35	56.52	15	17.5	17	43.97	12	44.9	33	43.17	14	52.3	23
July 9.5	58.10	2	50.6	35	56.63	11	19.1	16	44.04	7	48.1	32	43.27	10	54.5	22
19.5	58.05	5	53.9	33	56.70	7	20.6	15	44.05	1	51.2	31	43.33	6	56.5	20
29.4	57.92	13	57.0	31	56.73	3	22.0	14	44.00	5	54.1	29	43.35	2	58.4	19
Aug. 8.4	57.73	19	59.9	29	56.71	2	23.2	12	43.90	10	56.8	27	43.32	3	60.1	17
18.4	57.47	26	62.5	26	56.65	6	24.2	10	43.76	14	59.1	23	43.25	7	61.6	15
28.4	57.15	32	64.7	22	56.56	9	25.0	8	43.57	19	61.1	20	43.15	10	62.8	12
Sept. 7.3	56.79	36	66.4	17	56.43	13	25.6	6	43.34	23	62.7	16	43.01	14	63.7	9
17.3	56.39	40	67.7	13	56.28	15	26.0	4	43.08	26	63.9	12	42.85	16	64.3	6
27.3	55.97	42	68.5	8	56.12	16	26.2	2	42.81	27	64.6	7	42.68	17	64.7	4
Oct. 7.2	55.53	44	68.7	2	55.96	16	26.2	0	42.53	28	64.8	2	42.50	18	64.8	1
17.2	55.10	43	68.4	3	55.80	16	25.9	3	42.25	28	64.5	3	42.32	18	64.5	3
27.2	54.69	41	67.6	8	55.65	15	25.4	5	41.99	26	63.7	8	42.16	16	63.9	6
Nov. 6.2	54.31	38	66.3	13	55.52	13	24.7	7	41.75	24	62.4	13	42.02	14	63.0	9
16.1	53.97	34	64.5	18	55.43	9	23.9	8	41.55	20	60.7	17	41.91	11	61.9	11
26.1	53.69	28	62.2	23	55.37	6	22.9	10	41.39	16	58.6	21	41.83	8	60.5	14
Dec. 6.1	53.47	22	59.4	28	55.35	2	21.7	12	41.28	11	56.1	25	41.80	3	58.8	17
16.1	53.33	14	56.3	31	55.37	2	20.3	14	41.22	6	53.2	29	41.81	1	56.9	19
26.0	53.27	6	53.0	33	55.43	6	18.8	15	41.22	0	50.1	31	41.86	5	54.9	20
36.0	53.29	2	49.5	35	55.54	11	17.3	15	41.27	5	46.9	32	41.95	9	52.8	21
Sec δ, Tan δ	1.958		+1.682		1.003		+0.071		1.386		+0.960		1.035		+0.267	
Mean Place	55ˢ.178		54″.32		53ˢ.653		22″.62		41ˢ.284		51″.59		40ˢ.413		57″.74	
D′ψ a, Dω a	−0.04		−0.02		0.00		0.00		−0.02		−0.01		−0.01		0.00	
Dψ δ, Dω δ	+0.1		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Lyræ. Mag. 3.3				ζ Sagittarii. Mag. 2.7				ζ Aquilæ. Mag. 3.0				λ Aquilæ. Mag. 3.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	18 55		+32 33		18 57		−30 0		19 1		+13 43		19 1		− 5 0	
	s		″		s		″		s		″		s		″	
Jan. 1.0	39.55	10	61.5	29	3.00	16	30.5	6	23.15	11	50.8	20	36.46	13	59.3	10
11.0	39.65	14	58.6	28	3.16	20	29.9	5	23.26	15	48.8	20	36.59	17	60.3	9
21.0	39.79	19	55.8	27	3.36	24	29.4	5	23.41	18	46.8	19	36.76	20	61.2	9
30.9	39.98	22	53.1	24	3.60	27	28.9	5	23.59	22	44.9	17	36.96	22	62.1	8
Feb. 9.9	40.20	26	50.7	21	3.87	29	28.4	5	23.81	24	43.2	14	37.18	25	62.9	6
19.9	40.46	28	48.6	16	4.16	32	27.9	6	24.05	26	41.8	11	37.43	27	63.5	4
Mar. 1.8	40.74	30	47.0	11	4.48	33	27.3	5	24.31	28	40.7	7	37.70	28	63.9	2
11.8	41.04	32	45.9	6	4.81	34	26.8	5	24.59	29	40.0	3	37.98	29	64.1	1
21.8	41.36	32	45.3	0	5.15	35	26.3	6	24.88	29	39.7	2	38.27	30	64.0	4
31.8	41.68	33	45.3	5	5.50	36	25.7	5	25.17	30	39.9	6	38.57	31	63.6	6
Apr. 10.7	42.01	32	45.8	11	5.86	35	25.2	5	25.47	31	40.5	10	38.88	31	63.0	8
20.7	42.33	31	46.9	16	6.21	35	24.7	4	25.78	30	41.5	13	39.19	30	62.2	10
30.7	42.64	30	48.5	20	6.56	34	24.3	4	26.08	28	42.8	16	39.49	29	61.2	12
May 10.7	42.94	28	50.5	24	6.90	32	23.9	3	26.36	27	44.4	19	39.78	28	60.0	13
20.6	43.22	25	52.9	26	7.22	30	23.6	2	26.63	25	46.3	21	40.06	25	58.7	13
30.6	43.47	21	55.5	28	7.52	26	23.4	1	26.88	22	48.4	22	40.31	23	57.4	14
June 9.6	43.68	18	58.3	29	7.78	23	23.3	1	27.10	18	50.6	22	40.54	20	56.0	13
19.5	43.86	13	61.2	30	8.01	19	23.4	2	27.28	15	52.8	22	40.74	17	54.7	12
29.5	43.99	8	64.2	29	8.20	15	23.6	3	27.43	11	55.0	22	40.91	13	53.5	12
July 9.5	44.07	4	67.1	28	8.35	10	23.9	4	27.54	6	57.2	20	41.04	8	52.3	11
19.5	44.11	1	69.9	26	8.45	5	24.3	5	27.60	2	59.2	19	41.12	4	51.2	9
29.4	44.10	6	72.5	23	8.50	0	24.8	5	27.62	2	61.1	17	41.16	0	50.3	7
Aug. 8.4	44.04	11	74.8	21	8.50	5	25.3	6	27.60	6	62.8	14	41.16	5	49.6	6
18.4	43.93	14	76.9	18	8.45	10	25.9	6	27.54	9	64.2	12	41.11	8	49.0	5
28.4	43.79	18	78.7	14	8.35	13	26.5	5	27.45	13	65.4	9	41.03	11	48.5	3
Sept. 7.3	43.61	20	80.1	10	8.22	16	27.0	4	27.32	15	66.3	6	40.92	14	48.2	2
17.3	43.41	22	81.1	6	8.06	17	27.4	3	27.17	17	66.9	4	40.78	16	48.0	1
27.3	43.19	22	81.7	2	7.89	18	27.7	2	27.00	18	67.3	1	40.62	16	47.9	1
Oct. 7.2	42.97	22	81.9	3	7.71	18	27.9	1	26.82	18	67.4	3	40.46	16	48.0	2
17.2	42.75	21	81.6	7	7.53	17	28.0	1	26.64	16	67.1	5	40.30	15	48.2	3
27.2	42.54	19	80.9	11	7.36	14	27.9	2	26.48	14	66.6	8	40.15	12	48.5	4
Nov. 6.2	42.35	15	79.8	16	7.22	10	27.7	4	26.34	11	65.8	11	40.03	9	48.9	6
16.1	42.20	12	78.2	19	7.12	6	27.3	4	26.23	8	64.7	14	39.94	6	49.5	7
26.1	42.08	7	76.3	23	7.06	2	26.9	5	26.15	4	63.3	16	39.88	2	50.2	8
Dec. 6.1	42.01	2	74.0	25	7.04	4	26.4	5	26.11	0	61.7	18	39.86	2	51.0	8
16.1	41.99	2	71.5	27	7.08	9	25.9	6	26.11	5	59.9	19	39.88	6	51.8	9
26.0	42.01	7	68.8	29	7.17	13	25.3	6	26.16	9	58.0	20	39.94	11	52.7	10
36.0	42.08		65.9		7.30		24.7		26.25		56.0		40.05		53.7	
Sec δ, Tan δ	1.187		+0.639		1.155		−0.578		1.029		+0.244		1.004		−0.088	
Mean Place	41ˢ.324		70″.44		4ˢ.612		19″.99		24ˢ.670		60″.26		37ˢ.916		49″.21	
D′ψ α, Dω α	−0.02		−0.01		+0.01		+0.01		−0.01		0.00		0.00		0.00	
Dψ δ, Dω δ	+0.1		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*α* **Coronæ Australis.** Mag. 4.1				*ι* **Lyræ.** Mag. 5.1				*π* **Sagittarii.** Mag. 3.0				*ψ* **Sagittarii.** Mag. 4.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 3		−38 2		19 4		+35 57		19 4		−21 9		19 10		−25 24	
	s		″		s		″		s		″		s		″	
Jan. 1.0	31.49		38.8		10.00		39.1		33.93		56.4		10.87		37.9	
11.0	31.66	17	37.7	11	10.08	8	36.1	30	34.07	14	56.4	0	11.01	14	37.6	3
21.0	31.87	21	36.6	11	10.21	13	33.2	29	34.25	18	56.3	1	11.19	18	37.3	3
30.9	32.12	25	35.6	10	10.39	18	30.4	28	34.47	22	56.3	0	11.41	22	37.0	3
Feb. 9.9	32.41	29	34.6	10	10.61	22	27.8	26	34.71	24	56.2	1	11.66	25	36.6	4
19.9	32.72	31	33.7	9	10.86	25	25.6	22	34.97	26	56.0	2	11.93	27	36.2	4
Mar. 1.9	33.06	34	32.8	9	11.14	28	23.9	17	35.26	29	55.8	2	12.22	29	35.7	5
11.8	33.42	36	32.0	8	11.44	30	22.7	12	35.57	31	55.5	3	12.53	31	35.2	5
21.8	33.79	37	31.3	7	11.76	32	22.0	7	35.89	32	55.0	5	12.86	33	34.6	6
31.8	34.17	38	30.7	6	12.10	34	21.9	1	36.21	32	54.5	5	13.19	33	34.0	6
Apr. 10.7	34.56	39	30.1	6	12.44	34	22.4	5	36.54	33	53.9	6	13.53	34	33.4	6
20.7	34.95	39	29.6	5	12.77	33	23.4	10	36.87	33	53.2	7	13.87	34	32.7	7
30.7	35.33	38	29.3	3	13.10	33	25.0	16	37.20	33	52.5	7	14.21	34	32.0	7
May 10.7	35.70	37	29.1	2	13.41	31	27.0	20	37.52	32	51.8	7	14.54	33	31.4	6
20.6	36.05	35	29.1	0	13.70	29	29.3	23	37.82	30	51.1	7	14.86	32	30.9	5
30.6	36.37	32	29.2	1	13.96	26	32.0	27	38.10	28	50.5	6	15.15	29	30.4	5
June 9.6	36.67	30	29.5	3	14.18	22	34.9	29	38.36	26	49.9	6	15.42	27	30.0	4
19.6	36.93	26	30.0	5	14.36	18	37.9	30	38.58	22	49.4	5	15.66	24	29.7	3
29.5	37.14	21	30.6	6	14.50	14	41.0	31	38.77	19	49.0	4	15.86	20	29.6	1
July 9.5	37.31	17	31.3	7	14.59	9	44.0	30	38.91	14	48.8	2	16.01	15	29.6	0
19.5	37.42	11	32.2	9	14.63	4	47.0	30	39.01	10	48.7	1	16.12	11	29.7	1
29.4	37.48	6	33.1	9	14.62	1	49.8	28	39.06	5	48.7	0	16.18	6	29.9	2
Aug. 8.4	37.48	0	34.1	10	14.56	6	52.3	25	39.07	1	48.8	1	16.19	1	30.2	3
18.4	37.43	5	35.1	10	14.45	11	54.5	22	39.03	4	48.9	1	16.15	4	30.6	4
28.4	37.33	10	36.0	9	14.30	15	56.4	19	38.95	8	49.1	2	16.07	8	31.0	4
Sept. 7.3	37.19	14	36.8	8	14.12	18	58.0	16	38.83	12	49.4	3	15.95	12	31.4	4
17.3	37.01	18	37.5	7	13.91	21	59.1	11	38.69	14	49.6	2	15.81	14	31.8	4
27.3	36.82	19	38.0	5	13.68	23	59.8	7	38.53	16	49.8	2	15.65	16	32.1	3
Oct. 7.3	36.62	20	38.2	2	13.44	24	60.1	3	38.36	17	50.0	2	15.47	18	32.3	2
17.2	36.42	20	38.2	0	13.20	24	60.0	1	38.19	17	50.2	2	15.30	17	32.5	2
27.2	36.23	19	38.1	1	12.98	22	59.4	6	38.04	15	50.3	1	15.14	16	32.6	1
Nov. 6.2	36.07	16	37.7	4	12.78	20	58.3	11	37.91	13	50.3	0	15.00	14	32.5	1
16.1	35.95	12	37.1	6	12.61	17	56.8	15	37.81	10	50.3	0	14.90	10	32.4	1
26.1	35.87	8	36.3	8	12.48	13	54.8	20	37.75	6	50.3	0	14.83	7	32.2	2
Dec. 6.1	35.84	3	35.4	9	12.39	9	52.5	23	37.73	2	50.3	0	14.81	2	31.9	3
16.1	35.87	3	34.4	10	12.35	4	50.0	25	37.76	3	50.2	1	14.83	2	31.6	3
26.0	35.95	8	33.4	10	12.35	0	47.2	28	37.83	7	50.1	1	14.90	7	31.3	3
36.0	36.09	14	32.3	11	12.40	5	44.3	29	37.95	12	50.1	0	15.01	11	31.0	3
Sec *δ*, Tan *δ*	1.270		−0.782		1.235		+0.725		1.072		−0.387		1.107		−0.475	
Mean Place	33ˢ.225		27″.86		11ˢ.855		47″.40		35ˢ.437		45″.81		12ˢ.408		27″.04	
D′$_\psi$ *a*, D$_\omega$ *a*	+0.02		+0.01		−0.02		−0.01		+0.01		+0.01		+0.01		+0.01	
D$_\psi$ *δ*, D$_\omega$ *δ*	+0.1		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Draconis. Mag. 3.2				d Sagittarii. Mag. 5.0				θ Lyræ. Mag. 4.5				ω Aquilæ. Mag. 5.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 12		+67 30		19 12		−19 6		19 13		+37 58		19 13		+11 25	
	s		″		s		″		s		″		s		″	
Jan. 1.0	28.38		24.4		31.24		41.5		18.95		34.2		42.47		66.9	
11.0	28.36	2	20.9	35	31.37	13	41.6	1	19.02	7	31.2	30	42.57	10	65.0	19
21.0	28.45	9	17.4	35	31.54	17	41.7	1	19.14	12	28.2	30	42.71	14	63.2	18
30.9	28.65	20	14.0	34	31.74	20	41.7	0	19.30	16	25.4	28	42.88	17	61.4	18
Feb. 9.9	28.95	30	10.9	31	31.97	23	41.6	1	19.51	21	22.8	26	43.09	21	59.8	16
19.9	29.34	39	8.1	28	32.23	26	41.5	1	19.76	25	20.5	23	43.32	23	58.5	13
Mar. 1.9	29.80	46	5.8	23	32.51	28	41.3	2	20.04	28	18.6	19	43.57	25	57.5	10
11.8	30.33	53	4.0	18	32.80	29	41.0	3	20.34	30	17.3	13	43.84	27	56.9	6
21.8	30.91	58	2.9	11	33.11	31	40.6	4	20.66	32	16.5	8	44.12	28	56.6	3
31.8	31.51	60	2.5	4	33.43	32	40.0	6	21.00	34	16.3	2	44.42	30	56.8	2
Apr. 10.7	32.12	61	2.7	2	33.75	32	39.3	7	21.35	35	16.7	4	44.72	30	57.4	6
20.7	32.72	60	3.5	8	34.08	33	38.6	7	21.69	34	17.7	10	45.02	30	58.3	9
30.7	33.29	57	4.9	14	34.41	33	37.8	8	22.02	33	19.2	15	45.32	30	59.6	13
May 10.7	33.82	53	6.9	20	34.73	32	36.9	9	22.34	32	21.2	20	45.61	29	61.2	16
20.6	34.30	48	9.4	25	35.03	30	36.1	8	22.64	30	23.6	24	45.89	28	63.0	18
30.6	34.71	41	12.3	29	35.31	28	35.3	8	22.91	27	26.3	27	46.15	26	65.0	20
June 9.6	35.03	32	15.5	32	35.57	26	34.6	7	23.14	23	29.2	29	46.38	23	67.1	21
19.6	35.26	23	18.9	34	35.80	23	34.0	6	23.33	19	32.3	31	46.58	20	69.3	22
29.5	35.40	14	22.4	35	35.99	19	33.5	5	23.48	15	35.4	31	46.74	16	71.4	21
July 9.5	35.44	4	26.0	36	36.14	15	33.1	4	23.58	10	38.5	31	46.86	12	73.5	21
19.5	35.38	6	29.5	35	36.24	10	32.8	3	23.63	5	41.5	30	46.94	8	75.5	20
29.4	35.22	16	32.8	33	36.30	6	32.7	1	23.62	1	44.4	29	46.98	4	77.3	18
Aug. 8.4	34.97	25	35.9	31	36.31	1	32.7	0	23.56	6	47.1	27	46.97	1	78.9	16
18.4	34.63	34	38.8	29	36.28	3	32.7	0	23.46	10	49.5	24	46.92	5	80.3	14
28.4	34.22	41	41.3	25	36.21	7	32.8	1	23.31	15	51.5	20	46.83	9	81.5	12
Sept. 7.3	33.74	48	43.4	21	36.10	11	33.0	2	23.13	18	53.2	17	46.71	12	82.4	9
17.3	33.20	54	45.1	17	35.96	14	33.2	2	22.92	21	54.5	13	46.57	14	83.0	6
27.3	32.62	58	46.3	12	35.80	16	33.4	2	22.69	23	55.3	8	46.41	16	83.4	4
Oct. 7.3	32.02	60	47.0	7	35.63	17	33.6	2	22.44	25	55.7	4	46.23	18	83.5	1
17.2	31.42	60	47.1	1	35.47	16	33.8	2	22.19	25	55.6	1	46.06	17	83.3	2
27.2	30.83	59	46.7	4	35.32	15	34.0	2	21.96	23	55.1	5	45.90	16	82.9	4
Nov. 6.2	30.27	56	45.7	10	35.19	13	34.1	1	21.75	21	54.1	10	45.76	14	82.2	7
16.1	29.76	51	44.2	15	35.09	10	34.2	1	21.57	18	52.7	14	45.64	12	81.2	10
26.1	29.31	45	42.2	20	35.02	7	34.3	1	21.42	15	50.8	19	45.56	8	80.0	12
Dec. 6.1	28.94	37	39.7	25	34.99	3	34.3	0	21.31	11	48.5	23	45.52	4	78.6	14
16.1	28.65	29	36.8	29	35.01	2	34.4	1	21.25	6	46.0	25	45.52	0	77.0	16
26.0	28.46	19	33.6	32	35.07	6	34.4	0	21.24	1	43.2	28	45.56	4	75.2	18
36.0	28.38	8	30.2	34	35.18	11	34.5	1	21.28	4	40.2	30	45.64	8	73.3	19
Sec δ, Tan δ	2.614		+2.415		1.059		−0.346		1.268		+0.781		1.020		+0.202	
Mean Place	32ˢ.325		30″.54		32ˢ.714		30″.81		20ˢ.864		41″.91		43ˢ.972		76″.05	
D′ψ a, Dω a	−0.06		−0.05		+0.01		+0.01		−0.02		−0.02		−0.01		0.00	
Dψ δ, Dω δ	+0.1		−1.0		+0.1		−1.0		+0.1		−0.9		+0.1		−0.9	

Mean Solar Date.	*κ* Cygni. Mag. 4.0				*τ* Draconis. Mag. 4.6				*δ* Aquilæ. Mag. 3.4				*β* Cygni. Mag. 3.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 15		+53 11		19 17		+73 11		19 21		+ 2 56		19 27		+27 46	
	s		″		s		″		s		″		s		″	
Jan. 1.0	3.04		80.6		8.85		33.9		5.27		16.5		11.05		27.1	
11.0	3.08	4	77.2	34	8.77	8	30.5	34	5.37	10	15.1	14	11.13	8	24.5	26
21.0	3.19	11	73.8	34	8.83	6	27.0	35	5.51	14	13.8	13	11.24	11	21.9	26
30.9	3.36	17	70.6	32	9.04	21	23.6	34	5.68	17	12.5	13	11.39	15	19.4	25
Feb. 9.9	3.59	23	67.6	30	9.39	35	20.4	32	5.88	20	11.4	11	11.58	19	17.1	23
19.9	3.87	28	64.9	27	9.86	47	17.6	28	6.11	23	10.5	9	11.80	22	15.1	20
Mar. 1.9	4.20	33	62.7	22	10.43	57	15.2	24	6.36	25	9.8	7	12.05	25	13.5	16
11.8	4.57	37	61.1	16	11.09	66	13.4	18	6.63	27	9.4	4	12.33	28	12.4	11
21.8	4.96	39	60.1	10	11.81	72	12.2	12	6.91	28	9.4	0	12.62	29	11.8	6
31.8	5.37	41	59.8	3	12.58	77	11.6	6	7.20	29	9.7	3	12.93	31	11.7	1
Apr. 10.8	5.79	42	60.1	3	13.36	78	11.7	1	7.50	30	10.3	6	13.25	32	12.1	4
20.7	6.21	42	61.0	9	14.13	77	12.5	8	7.81	31	11.2	9	13.57	32	13.0	9
30.7	6.62	41	62.5	15	14.86	73	13.9	14	8.11	30	12.4	12	13.88	31	14.4	14
May 10.7	7.00	38	64.5	20	15.54	68	15.8	19	8.41	30	13.8	14	14.19	31	16.2	18
20.6	7.35	35	67.0	25	16.14	60	18.2	24	8.70	29	15.4	16	14.48	29	18.3	21
30.6	7.66	31	69.9	29	16.65	51	21.0	28	8.96	26	17.1	17	14.75	27	20.7	24
June 9.6	7.92	26	73.0	31	17.05	40	24.1	31	9.20	24	18.9	18	14.99	24	23.4	27
19.6	8.13	21	76.3	33	17.33	28	27.5	34	9.41	21	20.7	18	15.20	21	26.2	28
29.5	8.27	14	79.8	35	17.48	15	31.0	35	9.58	17	22.4	17	15.37	17	29.0	28
July 9.5	8.35	8	83.3	35	17.50	2	34.5	35	9.72	14	24.1	17	15.49	12	31.8	28
19.5	8.36	1	86.7	34	17.39	11	38.0	35	9.81	9	25.7	16	15.56	7	34.6	28
29.5	8.31	5	89.9	32	17.16	23	41.4	34	9.86	5	27.1	14	15.59	3	37.2	26
Aug. 8.4	8.20	11	92.9	30	16.81	35	44.6	32	9.87	1	28.3	12	15.57	2	39.6	24
18.4	8.03	17	95.6	27	16.34	47	47.5	29	9.84	3	29.4	11	15.51	6	41.7	21
28.4	7.80	23	98.0	24	15.77	57	50.1	26	9.77	7	30.2	8	15.41	10	43.5	18
Sept. 7.3	7.53	27	100.0	20	15.11	66	52.3	22	9.66	11	30.8	6	15.27	14	45.0	15
17.3	7.22	31	101.5	15	14.38	73	54.0	17	9.52	14	31.2	4	15.10	17	46.2	12
27.3	6.88	34	102.6	11	13.60	78	55.3	13	9.37	15	31.5	3	14.91	19	47.0	8
Oct. 7.3	6.53	35	103.2	6	12.79	81	56.1	8	9.21	16	31.6	1	14.71	20	47.4	4
17.2	6.18	35	103.3	1	11.97	82	56.3	2	9.05	16	31.4	2	14.50	21	47.4	0
27.2	5.84	34	102.8	5	11.16	81	56.0	3	8.90	15	31.0	4	14.30	20	47.0	4
Nov. 6.2	5.52	32	101.8	10	10.38	78	55.2	8	8.77	13	30.4	6	14.12	18	46.2	8
16.2	5.23	29	100.3	15	9.66	72	53.8	14	8.66	11	29.7	7	13.97	15	45.0	12
26.1	4.99	24	98.3	20	9.01	65	51.9	19	8.58	8	28.8	9	13.85	12	43.5	15
Dec. 6.1	4.80	19	95.9	24	8.46	55	49.5	24	8.54	4	27.8	10	13.77	8	41.6	19
16.1	4.67	13	93.1	28	8.03	43	46.7	28	8.54	0	26.6	12	13.72	5	39.4	22
26.0	4.60	7	90.0	31	7.72	31	43.6	31	8.58	4	25.3	13	13.72	0	37.0	24
36.0	4.60	0	86.7	33	7.55	17	40.2	34	8.66	8	23.9	14	13.76	4	34.5	25
Sec *δ*, Tan *δ*	1.670		+1.337		3.458		+3.310		1.001		+0.051		1.130		+0.527	
Mean Place	5ˢ.579		87″.20		14ˢ.079		39″.43		6ˢ.719		26″.06		12ˢ.750		34″.64	
$D'_\psi \alpha$, $D_\omega \alpha$	−0.03		−0.03		−0.08		−0.07		0.00		0.00		−0.01		−0.01	
$D_\psi \delta$, $D_\omega \delta$	+0.1		−0.9		+0.1		−0.9		+0.1		−0.9		+0.1		−0.9	

Mean Solar Date.	*ι* Cygni. Mag. 3.9				*μ* Aquilæ. Mag. 4.6				*h* Sagittarii. Mag. 4.7				*κ* Aquilæ. Mag. 5.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 27		+51 32		19 29		+ 7 11		19 31		−25 4		19 32		− 7 13	
	s		″		s		″		s		″		s		″	
Jan. 1.0	28.32	3	32.8	34	48.93	9	28.0	16	23.36	12	46.7	3	11.31	10	27.8	8
11.0	28.35	9	29.4	33	49.02	13	26.4	16	23.48	16	46.4	4	11.41	14	28.6	7
21.0	28.44	15	26.1	32	49.15	16	24.8	15	23.64	19	46.0	4	11.55	17	29.3	6
31.0	28.59	21	22.9	30	49.31	19	23.3	13	23.83	22	45.6	5	11.72	20	29.9	5
Feb. 9.9	28.80	26	19.9	27	49.50	22	22.0	11	24.05	25	45.1	5	11.92	22	30.4	4
19.9	29.06	30	17.2	22	49.72	24	20.9	9	24.30	28	44.6	6	12.14	25	30.8	2
Mar. 1.9	29.36	34	15.0	17	49.96	26	20.0	5	24.58	30	44.0	7	12.39	27	31.0	0
11.8	29.70	38	13.3	11	50.22	28	19.5	1	24.88	32	43.3	7	12.66	28	31.0	2
21.8	30.08	40	12.2	5	50.50	29	19.4	2	25.20	33	42.6	8	12.94	30	30.8	5
31.8	30.48	41	11.7	2	50.79	30	19.6	6	25.53	33	41.8	8	13.24	31	30.3	7
Apr. 10.8	30.89	41	11.9	8	51.09	30	20.2	9	25.86	34	41.0	9	13.55	31	29.6	10
20.7	31.30	40	12.7	14	51.39	30	21.1	12	26.20	34	40.1	8	13.86	31	28.6	11
30.7	31.70	38	14.1	19	51.69	30	22.3	15	26.54	34	39.3	8	14.17	30	27.5	12
May 10.7	32.08	35	16.0	24	51.99	29	23.8	17	26.88	33	38.5	7	14.47	30	26.3	13
20.7	32.43	32	18.4	28	52.28	27	25.5	19	27.21	31	37.8	7	14.77	28	25.0	14
30.6	32.75	27	21.2	31	52.55	24	27.4	20	27.52	28	37.1	5	15.05	25	23.6	14
June 9.6	33.02	22	24.3	33	52.79	21	29.4	20	27.80	25	36.6	4	15.30	23	22.2	13
19.6	33.24	17	27.6	34	53.00	18	31.4	20	28.05	22	36.2	3	15.53	19	20.9	12
29.5	33.41	10	31.0	35	53.18	14	33.4	19	28.27	17	35.9	1	15.72	16	19.7	12
July 9.5	33.51	4	34.5	34	53.32	10	35.3	18	28.44	13	35.8	0	15.88	11	18.5	10
19.5	33.55	3	37.9	33	53.42	6	37.1	16	28.57	8	35.8	2	15.99	7	17.5	9
29.5	33.52	9	41.2	31	53.48	1	38.7	15	28.65	3	36.0	3	16.06	2	16.6	7
Aug. 8.4	33.43	14	44.3	28	53.49	3	40.2	13	28.68	2	36.3	3	16.08	2	15.9	5
18.4	33.29	20	47.1	25	53.46	7	41.5	10	28.66	6	36.6	4	16.06	6	15.4	4
28.4	33.09	25	49.6	21	53.39	10	42.5	8	28.60	10	37.0	5	16.00	9	15.0	3
Sept. 7.4	32.84	28	51.7	17	53.29	13	43.3	6	28.50	13	37.5	5	15.91	12	14.7	2
17.3	32.56	31	53.4	12	53.16	15	43.9	3	28.37	16	38.0	4	15.79	14	14.5	0
27.3	32.25	33	54.6	7	53.01	16	44.2	1	28.21	17	38.4	3	15.65	16	14.5	1
Oct. 7.3	31.92	33	55.3	2	52.85	17	44.3	1	28.04	17	38.7	2	15.49	16	14.6	2
17.2	31.59	33	55.5	3	52.68	16	44.2	3	27.87	16	38.9	1	15.33	15	14.8	3
27.2	31.26	31	55.2	8	52.52	14	43.9	6	27.71	14	39.0	1	15.18	13	15.1	4
Nov. 6.2	30.95	28	54.4	14	52.38	12	43.3	8	27.57	12	39.1	0	15.05	11	15.5	5
16.2	30.67	24	53.0	18	52.26	8	42.5	10	27.45	8	39.1	1	14.94	8	16.0	5
26.1	30.43	19	51.2	23	52.18	5	41.5	12	27.37	4	39.0	2	14.86	4	16.5	6
Dec. 6.1	30.24	13	48.9	27	52.13	1	40.3	14	27.33	0	38.8	3	14.82	1	17.1	7
16.1	30.11	8	46.2	30	52.12	3	38.9	15	27.33	4	38.5	3	14.81	4	17.8	7
26.1	30.03	2	43.2	32	52.15	7	37.4	16	27.37	9	38.2	4	14.85	8	18.5	7
36.0	30.01		40.0		52.22		35.8		27.46		37.8		14.93		19.2	
Sec δ, Tan δ	1.608		+1.259		1.008		+0.126		1.104		−0.468		1.008		−0.127	
Mean Place	30ˢ.783		38″.51		50ˢ.389		37″.02		24ˢ.847		35″.26		12ˢ.723		17″.58	
D′ψ α, Dω α	−0.03		−0.03		0.00		0.00		+0.01		+0.01		0.00		0.00	
Dψ δ, Dω δ	+0.1		−0.9		+0.2		−0.9		+0.2		−0.9		+0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**θ Cygni.** Mag. 4.6				**54 Sagittarii.** Mag. 5.4				**β Sagittæ.** Mag. 4.4				**15 Cygni.** Mag. 5.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 34		+50 0		19 35		−16 29		19 37		+17 16		19 41		+37 8	
	s		″		s		″		s		″		s		″	
Jan. 1.0	4.15		63.7		42.99		47.6		6.93		17.8		6.47		31.6	
11.0	4.17	2	60.5	32	43.10	11	47.8	2	7.00	7	15.7	21	6.51	4	28.7	29
21.0	4.25	8	57.2	33	43.24	14	47.9	1	7.11	11	13.6	21	6.60	9	25.8	29
31.0	4.39	14	54.0	32	43.42	18	48.0	1	7.26	15	11.6	20	6.74	14	23.0	28
Feb. 9.9	4.58	19	51.0	30	43.62	20	48.0	0	7.44	18	9.8	18	6.92	18	20.4	26
19.9	4.83	25	48.3	27	43.85	23	47.9	1	7.65	21	8.2	16	7.13	21	18.1	23
Mar. 1.9	5.12	29	46.1	22	44.11	26	47.7	2	7.88	23	7.0	12	7.38	25	16.1	20
11.8	5.45	33	44.4	17	44.39	28	47.3	4	8.14	26	6.2	8	7.66	28	14.6	15
21.8	5.81	36	43.3	11	44.68	29	46.8	5	8.42	28	5.8	4	7.97	31	13.7	9
31.8	6.20	39	42.8	5	44.99	31	46.1	7	8.71	29	5.8	0	8.29	32	13.3	4
Apr. 10.8	6.60	40	42.9	1	45.31	32	45.3	8	9.01	30	6.3	5	8.63	34	13.5	2
20.7	7.00	40	43.6	7	45.63	32	44.4	9	9.32	31	7.2	9	8.98	35	14.3	8
30.7	7.39	39	45.0	14	45.96	33	43.4	10	9.63	31	8.5	13	9.32	34	15.6	13
May 10.7	7.77	38	46.9	19	46.28	32	42.4	10	9.93	30	10.1	16	9.65	33	17.4	18
20.7	8.12	35	49.2	23	46.59	31	41.3	11	10.22	29	12.0	19	9.97	32	19.7	23
30.6	8.44	32	51.9	27	46.88	29	40.3	10	10.49	27	14.2	22	10.26	29	22.3	26
June 9.6	8.72	28	55.0	31	47.15	27	39.3	10	10.74	25	16.6	24	10.52	26	25.1	28
19.6	8.95	23	58.3	33	47.39	24	38.4	9	10.96	22	19.0	24	10.74	22	28.1	30
29.5	9.12	17	61.7	34	47.60	21	37.7	7	11.14	18	21.4	24	10.92	18	31.2	31
July 9.5	9.23	11	65.1	34	47.77	17	37.1	6	11.28	14	23.8	24	11.05	13	34.4	32
19.5	9.28	5	68.5	34	47.89	12	36.6	5	11.37	9	26.1	23	11.13	8	37.5	31
29.5	9.27	1	71.8	33	47.97	8	36.2	4	11.42	5	28.3	22	11.16	3	40.5	30
Aug. 8.4	9.20	7	74.9	31	48.00	3	36.0	2	11.43	1	30.3	20	11.14	2	43.3	28
18.4	9.07	13	77.7	28	47.99	1	35.9	1	11.39	4	32.1	18	11.07	7	45.8	25
28.4	8.89	18	80.2	25	47.94	5	36.0	1	11.32	7	33.6	15	10.95	12	48.1	23
Sept. 7.4	8.66	23	82.4	22	47.85	9	36.1	1	11.21	11	34.8	12	10.79	16	50.0	19
17.3	8.39	27	84.1	17	47.72	13	36.3	2	11.07	14	35.8	10	10.60	19	51.5	15
27.3	8.09	30	85.4	13	47.57	15	36.5	2	10.91	16	36.4	6	10.39	21	52.6	11
Oct. 7.3	7.78	31	86.2	8	47.41	16	36.7	2	10.73	18	36.7	3	10.16	23	53.3	7
17.2	7.46	32	86.5	3	47.25	16	37.0	3	10.55	18	36.7	0	9.92	24	53.5	2
27.2	7.15	31	86.3	2	47.10	15	37.2	2	10.38	17	36.4	3	9.69	23	53.3	2
Nov. 6.2	6.85	30	85.6	7	46.96	14	37.4	2	10.22	16	35.7	7	9.47	22	52.6	7
16.2	6.58	27	84.3	13	46.85	11	37.6	2	10.09	13	34.7	10	9.28	19	51.5	11
26.1	6.35	23	82.5	18	46.77	8	37.8	2	9.99	10	33.5	12	9.12	16	49.9	16
Dec. 6.1	6.17	18	80.3	22	46.73	4	38.0	2	9.92	7	32.0	15	9.00	12	47.9	20
16.1	6.04	13	77.7	26	46.73	0	38.2	2	9.89	3	30.2	18	8.92	8	45.6	23
26.1	5.96	8	74.8	29	46.77	4	38.4	2	9.90	1	28.3	19	8.88	4	43.0	26
36.0	5.94	2	71.7	31	46.85	8	38.6	2	9.94	4	26.3	20	8.89	1	40.2	28
Sec δ, Tan δ	1.556		+1.192		1.043		−0.296		1.047		+0.311		1.254		+0.757	
Mean Place	6ˢ.528		69″.03		44ˢ.412		36″.69		8ˢ.468		25″.79		8ˢ.377		37″.57	
D′ψ α, Dω α	−0.03		−0.03		+0.01		+0.01		−0.01		−0.01		−0.02		−0.02	
Dψ δ, Dω δ	+0.2		−0.9		+0.2		−0.9		+0.2		−0.9		+0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*f* **Sagittarii.** Mag. 5.1				*γ* **Aquilæ.** Mag. 2.8				*δ* **Cygni.** Mag. 3.0				*δ* **Sagittæ.** Mag. 3.8			
	Right Ascension.		**Declination S.**		**Right Ascension.**		**Declination N.**		**Right Ascension.**		**Declination N.**		**Right Ascension.**		**Declination N.**	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 41		−19 58		19 42		+10 23		19 42		+44 54		19 43		+18 18	
	s		″		s		″		s		″		s		″	
Jan. 1.0	15.87	10	26.8	0	5.94	7	53.4	17	13.24	2	59.3	31	28.96	7	60.9	21
11.0	15.97	14	26.8	1	6.01	11	51.7	17	13.26	7	56.2	31	29.03	11	58.8	21
21.0	16.11	17	26.7	2	6.12	15	50.0	16	13.33	13	53.1	31	29.14	14	56.7	21
31.0	16.28	21	26.5	2	6.27	18	48.4	15	13.46	18	50.0	29	29.28	17	54.6	19
Feb. 9.9	16.49	23	26.3	3	6.45	21	46.9	13	13.64	23	47.1	25	29.45	20	52.7	16
19.9	16.72	26	26.0	4	6.66	23	45.6	9	13.87	27	44.6	22	29.65	23	51.1	12
Mar. 1.9	16.98	28	25.6	5	6.89	25	44.7	6	14.14	30	42.4	17	29.88	26	49.9	9
11.9	17.26	30	25.1	7	7.14	27	44.1	2	14.44	33	40.7	11	30.14	28	49.0	5
21.8	17.56	31	24.4	8	7.41	29	43.9	1	14.77	35	39.6	5	30.42	29	48.5	0
31.8	17.87	32	23.6	9	7.70	30	44.0	5	15.12	37	39.1	1	30.71	30	48.5	5
Apr. 10.8	18.19	33	22.7	9	8.00	30	44.5	9	15.49	38	39.2	7	31.01	31	49.0	9
20.7	18.52	33	21.8	10	8.30	31	45.4	13	15.87	37	39.9	13	31.32	31	49.9	13
30.7	18.85	33	20.8	10	8.61	30	46.7	16	16.24	36	41.2	18	31.63	30	51.2	16
May 10.7	19.18	32	19.8	10	8.91	29	48.3	18	16.60	34	43.0	23	31.93	29	52.8	19
20.7	19.50	30	18.8	9	9.20	28	50.1	20	16.94	31	45.3	26	32.22	28	54.7	22
30.6	19.80	28	17.9	8	9.48	25	52.1	21	17.25	27	47.9	30	32.50	25	56.9	24
June 9.6	20.08	25	17.1	7	9.73	22	54.2	21	17.52	23	50.9	32	32.75	22	59.3	25
19.6	20.33	22	16.4	6	9.95	19	56.3	22	17.75	18	54.1	33	32.97	19	61.8	25
29.6	20.55	18	15.8	5	10.14	15	58.5	21	17.93	13	57.4	33	33.16	15	64.3	24
July 9.5	20.73	13	15.3	3	10.29	11	60.6	20	18.06	7	60.7	33	33.31	10	66.7	24
19.5	20.86	8	15.0	1	10.40	6	62.6	18	18.13	1	64.0	32	33.41	5	69.1	23
29.5	20.94	4	14.9	0	10.46	2	64.4	17	18.14	4	67.2	30	33.46	1	71.4	21
Aug. 8.4	20.98	1	14.9	1	10.48	3	66.1	15	18.10	9	70.2	28	33.47	3	73.5	18
18.4	20.97	5	15.0	2	10.45	6	67.6	12	18.01	14	73.0	25	33.44	7	75.3	16
28.4	20.92	9	15.2	2	10.39	10	68.8	10	17.87	19	75.5	21	33.37	11	76.9	13
Sept. 7.4	20.83	12	15.4	3	10.29	13	69.8	8	17.68	23	77.6	17	33.26	14	78.2	10
17.3	20.71	15	15.7	3	10.16	15	70.6	5	17.45	25	79.3	13	33.12	16	79.2	7
27.3	20.56	16	16.0	3	10.01	16	71.1	2	17 20	27	80.6	8	32.96	17	79.9	4
Oct. 7.3	20.40	16	16.3	3	9.85	17	71.3	1	16.93	28	81.4	4	32.79	18	80.3	0
17.3	20.24	16	16.6	3	9.68	16	71.2	3	16.65	28	81.8	1	32.61	17	80.3	3
27.2	20.08	14	16.9	2	9.52	15	70.9	5	16.37	26	81.7	7	32.44	16	80.0	6
Nov. 6.2	19.94	12	17.1	1	9.37	12	70.4	8	16.11	23	81.0	12	32.28	14	79.4	9
16.2	19.82	8	17.2	1	9.25	9	69.6	11	15.88	20	79.8	16	32.14	11	78.5	13
26.1	19.74	5	17.3	0	9.16	6	68.5	13	15.68	16	78.2	21	32.03	7	77.2	15
Dec. 6.1	19.69	1	17.3	0	9.10	3	67.2	14	15.52	12	76.1	25	31.96	4	75.7	17
16.1	19.68	3	17.3	0	9.07	1	65.8	16	15.40	7	73.6	27	31.92	0	74.0	19
26.1	19.71	8	17.3	1	9.08	5	64.2	17	15.33	1	70.9	30	31.92	4	72.1	21
36.0	19.79		17.2		9.13		62.5		15.32		67.9		31.96		70.0	
Sec δ, Tan δ	1.064		−0.363		1.017		+0.183		1 412		+0.997		1.053		+0.331	
Mean Place	17^{s}.289		15″.54		7^{s}.410		61″.91		15^{s}.393		64″.44		30^{s}.515		68″.53	
$D'_{\psi}\,a$, $D_{\omega}\,a$	+0.01		+0.01		0.00		−0.01		−0.02		−0.03		−0.01		−0.01	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	+0.2		−0.9		+0.2		−0.9		+0.2		−0.9		+0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Aquilæ.				η Aquilæ.				ε Draconis.				ι Sagittarii.			
	Mag. 0.9				Var. 3.7–4.4				Mag. 4.0				Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 46		+ 8 37		19 48		+ 0 46		19 48		+70 2		19 49		−42 5	
	s		″		s		″		s		″		s		″	
Jan. 1.0	30.86		67.6		1.08		44.6		23.98		44.0		13.99		64.8	
11.0	30.93	7	66.0	16	1.16	8	43.4	12	23.85	13	40.7	33	14.10	11	63.4	14
21.0	31.04	11	64.4	16	1.28	12	42.3	11	23.84	1	37.3	34	14.26	16	61.9	15
31.0	31.19	15	62.9	15	1.43	15	41.2	11	23.95	11	33.9	34	14.46	20	60.4	15
Feb. 9.9	31.37	18	61.5	14	1.61	18	40.2	10	24.18	23	30.6	33	14.71	25	58.8	16
19.9	31.57	20	60.3	12	1.81	20	39.5	7	24.52	34	27.6	30	14.99	28	57.3	15
Mar. 1.9	31.80	23	59.4	9	2.04	23	39.0	5	24.96	44	25.0	26	15.30	31	55.9	14
11.9	32.05	25	58.9	5	2.29	25	38.8	2	25.48	52	22.9	21	15.64	34	54.5	14
21.8	32.32	27	58.8	1	2.56	27	38.8	0	26.07	59	21.3	16	16.00	36	53.2	13
31.8	32.61	29	59.0	2	2.85	29	39.1	3	26.71	64	20.4	9	16.39	39	52.0	12
Apr. 10.8	32.91	30	59.6	6	3.15	30	39.8	7	27.38	67	20.1	3	16.79	40	50.9	11
20.7	33.21	30	60.5	9	3.45	30	40.8	10	28.05	67	20.5	4	17.19	40	49.9	10
30.7	33.52	31	61.7	12	3.76	31	42.0	12	28.71	66	21.5	10	17.60	41	49.1	8
May 10.7	33.82	30	63.2	15	4.06	30	43.4	14	29.34	63	23.1	16	18.01	41	48.5	6
20.7	34.11	29	65.0	18	4.36	30	45.0	16	29.92	58	25.2	21	18.41	40	48.2	3
30.6	34.39	28	67.0	20	4.64	28	46.7	17	30.43	51	27.8	26	18.78	37	48.1	1
June 9.6	34.65	26	69.1	21	4.90	26	48.4	17	30.86	43	30.8	30	19.13	35	48.2	1
19.6	34.88	23	71.2	21	5.13	23	50.2	18	31.20	34	34.1	33	19.45	32	48.5	3
29.6	35.07	19	73.3	21	5.33	20	51.9	17	31.44	24	37.6	35	19.72	27	49.1	6
July 9.5	35.23	16	75.3	20	5.49	16	53.5	16	31.57	13	41.2	36	19.94	22	49.9	8
19.5	35.34	11	77.2	19	5.61	12	55.0	15	31.59	2	44.8	36	20.11	17	50.8	9
29.5	35.41	7	79.0	18	5.69	8	56.4	14	31.49	10	48.3	35	20.22	11	51.9	11
Aug. 8.4	35.44	3	80.6	16	5.73	4	57.6	12	31.29	20	51.7	34	20.27	5	53.1	12
18.4	35.42	2	82.0	14	5.72	1	58.6	10	30.99	30	54.9	32	20.26	1	54.4	13
28.4	35.36	6	83.2	12	5.67	5	59.5	9	30.59	40	57.8	29	20.20	6	55.6	12
Sept. 7.4	35.27	9	84.2	10	5.58	9	60.1	6	30.11	48	60.4	26	20.09	11	56.8	12
17.3	35.15	12	84.9	7	5.46	12	60.5	4	29.56	55	62.6	22	19.94	15	57.9	11
27.3	35.00	15	85.4	5	5.32	14	60.7	2	28.95	61	64.3	17	19.75	19	58.8	9
Oct. 7.3	34.84	16	85.6	2	5.17	15	60.8	1	28.30	65	65.6	13	19.54	21	59.4	6
17.3	34.68	16	85.5	1	5.01	16	60.7	1	27.64	66	66.3	7	19.32	22	59.8	4
27.2	34.52	16	85.2	3	4.86	15	60.4	3	26.97	67	66.5	2	19.11	21	59.9	1
Nov. 6.2	34.37	15	84.7	5	4.72	14	59.9	5	26.31	66	66.1	4	18.92	19	59.7	2
16.2	34.25	12	84.0	7	4.60	12	59.3	6	25.69	62	65.1	10	18.76	16	59.3	4
26.1	34.16	9	83.0	10	4.51	9	58.5	8	25.13	56	63.6	15	18.64	12	58.6	7
Dec. 6.1	34.10	6	81.8	12	4.46	5	57.6	9	24.64	49	61.6	20	18.56	8	57.7	9
16.1	34.07	3	80.5	13	4.44	2	56.6	10	24.23	41	59.1	25	18.53	3	56.6	11
26.1	34.08	1	79.0	15	4.46	2	55.5	11	23.92	31	56.2	29	18.55	2	55.3	13
36.0	34.13	5	77.4	16	4.51	5	54.4	11	23.72	20	53.0	32	18.63	8	53.9	14
Sec δ, Tan δ	1.011		+0.152		1.000		+0.014		2.930		+2.754		1.347		−0.903	
Mean Place	32ˢ.315		76″.10		2ˢ.492		53″.93		28ˢ.501		46″.74		15ˢ.639		51″.71	
D′ψ α, Dω α	0.00		0.00		0.00		0.00		−0.07		−0.08		+0.02		+0.03	
Dψ δ, Dω δ	+0.2		−0.9		+0.2		−0.9		+0.2		−0.9		+0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Pavonis. Mag. 4.1				β Aquilæ. Mag. 3.9				γ Sagittæ. Mag. 3.7				c Sagittarii. Mag. 4.6			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 19 50		° ′ −73 8		h m 19 51		° ′ + 6 11		h m 19 54		° ′ +19 14		h m 19 57		° ′ −27 57	
	s		″		s		″		s		″		s		″	
Jan. 1.0	28.93		42.7		0.96		10.9		51.72		71.7		17.21		21.3	
11.0	29.07	14	39.7	30	1.03	7	9.5	14	51.77	5	69.6	21	17.30	9	20.7	6
21.0	29.34	27	36.6	31	1.14	11	8.0	15	51.86	9	67.5	21	17.43	13	20.0	7
31.0	29.74	40	33.6	30	1.28	14	6.6	14	51.99	13	65.4	21	17.60	17	19.3	7
Feb. 9.9	30.26	52	30.7	29	1.45	17	5.3	13	52.15	16	63.5	19	17.80	20	18.5	8
19.9	30.89	63	28.0	27	1.65	20	4.3	10	52.34	19	61.9	16	18.03	23	17.7	8
Mar. 1.9	31.61	72	25.5	25	1.87	22	3.5	8	52.56	22	60.6	13	18.29	26	16.8	9
11.9	32.40	79	23.3	22	2.12	25	3.0	5	52.81	25	59.6	10	18.58	29	15.9	9
21.8	33.25	85	21.4	19	2.39	27	2.9	1	53.08	27	59.1	5	18.89	31	14.9	10
31.8	34.15	90	19.9	15	2.67	28	3.2	3	53.37	29	59.0	1	19.21	32	13.8	11
Apr. 10.8	35.08	93	18.7	12	2.97	30	3.8	6	53.67	30	59.4	4	19.55	34	12.7	11
20.7	36.03	95	18.0	7	3.27	30	4.7	9	53.98	31	60.3	9	19.90	35	11.7	10
30.7	36.97	94	17.7	3	3.58	31	5.9	12	54.30	32	61.6	13	20.25	35	10.7	10
May 10.7	37.90	93	17.8	1	3.88	30	7.4	15	54.61	31	63.2	16	20.60	35	9.7	10
20.7	38.79	89	18.3	5	4.18	30	9.1	17	54.91	30	65.1	19	20.94	34	8.8	9
30.6	39.62	83	19.2	9	4.46	28	11.0	19	55.19	28	67.3	22	21.27	33	8.1	7
June 9.6	40.38	76	20.5	13	4.72	26	12.9	19	55.45	26	69.7	24	21.58	31	7.5	6
19.6	41.05	67	22.2	17	4.95	23	14.9	20	55.68	23	72.2	25	21.86	28	7.1	4
29.6	41.61	56	24.2	20	5.15	20	16.9	20	55.87	19	74.8	26	22.10	24	6.9	2
July 9.5	42.05	44	26.5	23	5.31	16	18.8	19	56.03	16	77.3	25	22.30	20	6.9	0
19.5	42.36	31	28.9	24	5.43	12	20.6	18	56.14	11	79.8	25	22.46	16	7.0	1
29.5	42.53	17	31.4	25	5.50	7	22.2	16	56.21	7	82.1	23	22.57	11	7.3	3
Aug. 8.4	42.56	3	34.0	26	5.53	3	23.7	15	56.23	2	84.2	21	22.62	5	7.7	4
18.4	42.45	11	36.5	25	5.52	1	25.0	13	56.21	2	86.1	19	22.63	1	8.2	5
28.4	42.20	25	38.8	23	5.47	5	26.1	11	56.14	7	87.8	17	22.59	4	8.8	6
Sept. 7.4	41.83	37	40.9	21	5.38	9	26.9	8	56.04	10	89.2	14	22.51	8	9.4	6
17.3	41.36	47	42.7	18	5.26	12	27.5	6	55.91	13	90.3	11	22.39	12	10.0	6
27.3	40.81	55	44.1	14	5.12	14	27.9	4	55.75	16	91.1	8	22.24	15	10.6	6
Oct. 7.3	40.20	61	45.0	9	4.97	15	28.1	2	55.58	17	91.6	5	22.07	17	11.1	5
17.3	39.56	64	45.4	4	4.81	16	28.0	1	55.40	18	91.7	1	21.90	17	11.5	4
27.2	38.93	63	45.2	2	4.65	16	27.7	3	55.22	18	91.5	2	21.73	17	11.8	3
Nov. 6.2	38.33	60	44.5	7	4.50	15	27.2	5	55.06	16	91.0	5	21.57	16	11.9	1
16.2	37.79	54	43.3	12	4.38	12	26.5	7	54.92	14	90.1	9	21.44	13	11.9	0
26.1	37.33	46	41.6	17	4.29	9	25.6	9	54.81	11	88.9	12	21.34	10	11.8	1
Dec. 6.1	36.98	35	39.5	21	4.23	6	24.5	11	54.72	9	87.5	14	21.28	6	11.5	3
16.1	36.76	22	37.0	25	4.20	3	23.2	13	54.67	5	85.8	17	21.26	2	11.1	4
26.1	36.68	8	34.2	28	4.21	1	21.8	14	54.66	1	83.9	19	21.28	2	10.6	5
36.0	36.73	5	31.2	30	4.26	5	20.4	14	54.69	3	81.8	21	21.34	6	10.0	6
Sec δ, Tan δ	3.448		−3.300		1.006		+0.108		1.059		+0.349		1.132		−0.531	
Mean Place	32ˢ.758		28″.45		2ˢ.388		19″.63		53ˢ.262		78″.79		18ˢ.635		9″.01	
D′ψ α, Dω α	+0.08		+0.10		0.00		0.00		−0.01		−0.01		+0.01		+0.02	
Dψ δ, Dω δ	+0.2		−0.9		+0.2		−0.9		+0.2		−0.9		+0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**τ Aquilæ.** Mag. 5.6				**θ Aquilæ.** Mag. 3.4				**o Cygni** *seq.* Mag. 4.0				**κ Cephei.** Mag. 4.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 59		+ 7 1		20 6		− 1 4		20 10		+46 28		20 11		+77 26	
	s		″		s		″		s		″		s		″	
Jan. 1.1	51.99	6	46.8	15	47.63	6	57.9	10	51.36	2	34.5	30	43.31	38	59.4	31
11.0	52.05	10	45.3	15	47.69	10	58.9	10	51.34	4	31.5	31	42.93	19	56.3	33
21.0	52.15	13	43.8	14	47.79	13	59.9	9	51.38	9	28.4	31	42.74	1	53.0	34
31.0	52.28	17	42.4	12	47.92	16	60.8	8	51.47	14	25.3	29	42.75	20	49.6	33
Feb. 10.0	52.45	19	41.2	10	48.08	19	61.6	6	51.61	19	22.4	27	42.95	38	46.3	31
19.9	52.64	22	40.2	8	48.27	22	62.2	4	51.80	24	19.7	23	43.33	55	43.2	28
Mar. 1.9	52.86	24	39.4	5	48.49	24	62.6	1	52.04	28	17.4	19	43.88	70	40.4	24
11.9	53.10	26	38.9	2	48.73	26	62.7	1	52.32	32	15.5	13	44.58	83	38.0	18
21.8	53.36	28	38.7	2	48.99	28	62.6	4	52.64	35	14.2	8	45.41	92	36.2	13
31.8	53.64	30	38.9	6	49.27	29	62.2	8	52.99	37	13.4	2	46.33	99	34.9	6
Apr. 10.8	53.94	30	39.5	10	49.56	31	61.4	10	53.36	38	13.2	4	47.32	101	34.3	0
20.8	54.24	31	40.5	12	49.87	31	60.4	12	53.74	38	13.6	10	48.33	101	34.3	6
30.7	54.55	30	41.7	15	50.18	31	59.2	14	54.12	38	14.6	16	49.34	97	34.9	13
May 10.7	54.85	30	43.2	18	50.49	30	57.8	16	54.50	36	16.2	21	50.31	90	36.2	18
20.7	55.15	28	45.0	19	50.79	29	56.2	17	54.86	34	18.3	25	51.21	80	38.0	23
30.7	55.43	26	46.9	20	51.08	27	54.5	18	55.20	31	20.8	28	52.01	68	40.3	27
June 9.6	55.69	24	48.9	20	51.35	25	52.7	17	55.51	26	23.6	31	52.69	55	43.0	31
19.6	55.93	21	50.9	21	51.60	21	51.0	17	55.77	22	26.7	33	53.24	40	46.1	33
29.6	56.14	17	53.0	20	51.81	18	49.3	16	55.99	17	30.0	34	53.64	23	49.4	35
July 9.5	56.31	13	55.0	19	51.99	14	47.7	14	56.16	11	33.4	34	53.87	6	52.9	36
19.5	56.44	8	56.9	17	52.13	10	46.3	13	56.27	5	36.8	34	53.93	11	56.5	36
29.5	56.52	4	58.6	15	52.23	5	45.0	12	56.32	1	40.2	32	53.82	27	60.1	36
Aug. 8.5	56.56	1	60.1	14	52.28	1	43.8	10	56.31	6	43.4	30	53.55	43	63.7	34
18.4	56.55	5	61.5	12	52.29	4	42.8	7	56.25	12	46.4	27	53.12	58	67.1	31
28.4	56.50	8	62.7	9	52.25	7	42.1	6	56.13	17	49.1	24	52.54	72	70.2	29
Sept. 7.4	56.42	11	63.6	7	52.18	10	41.5	4	55.96	21	51.5	21	51.82	84	73.1	25
17.3	56.31	14	64.3	4	52.08	13	41.1	2	55.75	24	53.6	16	50.98	94	75.6	21
27.3	56.17	15	64.7	2	51.95	15	40.9	0	55.51	26	55.2	12	50.04	101	77.7	17
Oct. 7.3	56.02	16	64.9	0	51.80	15	40.9	1	55.25	28	56.4	7	49.03	106	79.4	12
17.3	55.86	16	64.9	2	51.65	15	41.0	2	54.97	28	57.1	2	47.97	108	80.6	6
27.2	55.70	15	64.7	5	51.50	14	41.2	4	54.69	27	57.3	3	46.89	108	81.2	1
Nov. 6.2	55.55	12	64.2	7	51.36	12	41.6	6	54.42	25	57.0	8	45.81	105	81.3	5
16.2	55.43	10	63.5	9	51.24	10	42.2	7	54.17	22	56.2	13	44.76	99	80.8	11
26.2	55.33	7	62.6	11	51.14	7	42.9	8	53.95	19	54.9	17	43.77	89	79.7	16
Dec. 6.1	55.26	3	61.5	12	51.07	3	43.7	9	53.76	15	53.2	22	42.88	78	78.1	21
16.1	55.23	0	60.3	14	51.04	1	44.6	9	53.61	10	51.0	26	42.10	64	76.0	26
26.1	55.23	4	58.9	14	51.05	4	45.5	10	53.51	5	48.4	29	41.46	48	73.4	29
36.0	55.27		57.5		51.09		46.5		53.46		45.5		40.98		70.5	
Sec δ, Tan δ	1.008		+0.123		1.000		−0.019		1.452		+1.053		4.602		+4.492	
Mean Place	$53^{s}.412$		$55''.16$		$48^{s}.987$		$48''.67$		$53^{s}.571$		$37''.33$		$50^{s}.392$		$59''.47$	
D′ψ a, Dω a	0.00		0.00		0.00		0.00		−0.02		−0.04		−0.10		−0.16	
Dψ δ, Dω δ	+0.2		−0.9		+0.2		−0.9		+0.2		−0.8		+0.2		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**24 Vulpeculæ.** Mag. 5.4 Right Ascension.		**24 Vulpeculæ.** Declination N.		**α² Capricorni.** Mag. 3.8 Right Ascension.		**α² Capricorni.** Declination S.		**β Capricorni.** Mag. 3.2 Right Ascension		**β Capricorni.** Declination S.		**α Pavonis.** Mag. 2.1 Right Ascension.		**α Pavonis.** Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	20 13		+24 23		20 13		−12 48		20 16		−15 3		20 18		−57 0	
	s		″		s		″		s		″		s		″	
Jan. 1.1	2.14		63.5		12.40		65.4		6.19		35.5		44.35		68.6	
11.0	2.17	3	61.2	23	12.47	7	65.7	3	6.25	6	35.7	2	44.42	7	66.3	23
21.0	2.24	7	58.9	23	12.57	10	66.0	3	6.35	10	35.8	1	44.55	13	63.9	24
31.0	2.35	11	56.7	22	12.70	13	66.2	2	6.49	14	35.8	0	44.75	20	61.4	25
Feb. 10.0	2.49	14	54.6	21	12.87	17	66.2	0	6.66	17	35.7	1	45.01	26	59.0	24
19.9	2.66	17	52.7	19	13.07	20	66.1	1	6.85	19	35.5	2	45.33	32	56.6	24
Mar. 1.9	2.87	21	51.1	16	13.29	22	65.9	2	7.07	22	35.1	4	45.69	36	54.3	23
11.9	3.11	24	49.9	12	13.53	24	65.5	4	7.32	25	34.6	5	46.10	41	52.1	22
21.8	3.38	27	49.2	7	13.80	27	64.9	6	7.59	27	33.9	7	46.55	45	50.1	20
31.8	3.66	28	48.9	3	14.09	29	64.1	8	7.88	29	33.0	9	47.03	48	48.3	18
Apr. 10.8	3.96	30	49.1	2	14.39	30	63.1	10	8.18	30	32.0	10	47.54	51	46.8	15
20.8	4.27	31	49.8	7	14.70	31	62.0	11	8.49	31	30.9	11	48.06	52	45.5	13
30.7	4.59	32	51.0	12	15.02	32	60.8	12	8.81	32	29.7	12	48.59	53	44.5	10
May 10.7	4.91	32	52.6	16	15.34	32	59.5	13	9.14	33	28.4	13	49.12	53	43.9	6
20.7	5.22	31	54.6	20	15.66	32	58.2	13	9.46	32	27.1	13	49.64	52	43.6	3
30.7	5.52	30	56.9	23	15.97	31	56.8	14	9.77	31	25.8	13	50.15	51	43.7	1
June 9.6	5.80	28	59.4	25	16.26	29	55.4	14	10.07	30	24.5	13	50.63	48	44.1	4
19.6	6.04	24	62.0	26	16.52	26	54.2	12	10.34	27	23.3	12	51.06	43	44.9	8
29.6	6.25	21	64.7	27	16.75	23	53.1	11	10.58	24	22.3	10	51.44	38	46.0	11
July 9.5	6.42	17	67.5	28	16.95	20	52.1	10	10.78	20	21.5	8	51.76	32	47.3	13
19.5	6.55	13	70.3	28	17.11	16	51.3	8	10.94	16	20.8	7	52.01	25	48.9	16
29.5	6.63	8	72.9	26	17.22	11	50.7	6	11.05	11	20.3	5	52.18	17	50.7	18
Aug. 8.5	6.67	4	75.3	24	17.28	6	50.2	5	11.12	7	19.9	4	52.28	10	52.6	19
18.4	6.66	1	77.5	22	17.30	2	49.9	3	11.14	2	19.7	2	52.30	2	54.6	20
28.4	6.60	6	79.5	20	17.27	3	49.7	2	11.12	2	19.6	1	52.24	6	56.6	20
Sept. 7.4	6.50	10	81.2	17	17.21	6	49.6	1	11.06	6	19.7	1	52.10	14	58.5	19
17.4	6.37	13	82.6	14	17.11	10	49.7	1	10.96	10	19.9	2	51.91	19	60.2	17
27.3	6.21	16	83.7	11	16.98	13	49.9	2	10.84	12	20.2	3	51.67	24	61.6	14
Oct. 7.3	6.04	17	84.4	7	16.84	14	50.1	2	10.70	14	20.5	3	51.39	28	62.7	11
17.3	5.86	18	84.7	3	16.69	15	50.4	3	10.54	16	20.8	3	51.09	30	63.4	7
27.2	5.68	18	84.7	0	16.54	15	50.7	3	10.38	16	21.1	3	50.78	31	63.7	3
Nov. 6.2	5.50	18	84.3	4	16.40	14	51.1	4	10.24	14	21.4	3	50.48	30	63.6	1
16.2	5.34	16	83.5	8	16.28	12	51.5	4	10.12	12	21.7	3	50.21	27	63.1	5
26.2	5.21	13	82.4	11	16.18	10	51.8	3	10.02	10	22.0	3	49.98	23	62.2	9
Dec. 6.1	5.10	11	80.9	15	16.11	7	52.2	4	9.95	7	22.3	3	49.80	18	60.9	13
16.1	5.03	7	79.1	18	16.08	3	52.5	3	9.92	3	22.6	3	49.69	11	59.2	17
26.1	5.00	3	77.1	20	16.08	0	52.9	4	9.92	0	22.8	2	49.64	5	57.2	20
36.1	5.00	0	75.0	21	16.12	4	53.2	3	9.96	4	23.0	2	49.66	2	55.0	22
Sec δ, Tan δ	1.098		+0.454		1.025		−0.227		1.036		−0.269		1.837		−1.541	
Mean Place	3ˢ.739		69″.05		13ˢ.724		54″.64		7ˢ.506		24″.43		46ˢ.281		53″.18	
D′ψ α, Dω α	−0.01		−0.02		+0.01		+0.01		+0.01		+0.01		+0.03		+0.06	
Dψ δ, Dω δ	+0.2		−0.8		+0.2		−0.8		+0.2		−0.8		+0.2		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Cygni. Mag. 2.3				π Capricorni. Mag. 5.2				ρ Capricorni. Mag. 5.0				41 Cygni. Mag. 4.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 20 19		° ′ +39 58		h m 20 22		° ′ −18 29		h m 20 23		° ′ −18 6		h m 20 25		° ′ +30 4	
	s		″		s		″		s		″		s		″	
Jan. 1.1	4.38		36.7		19.27		62.5		52.70		18.6		48.81		35.8	
11.0	4.37	1	33.9	28	19.33	6	62.5	0	52.76	6	18.6	0	48.81	0	33.4	24
21.0	4.41	4	31.0	29	19.43	10	62.4	1	52.85	9	18.5	1	48.86	5	30.9	25
31.0	4.50	9	28.1	29	19.56	13	62.2	2	52.98	13	18.3	2	48.95	9	28.4	25
Feb. 10.0	4.63	13	25.4	27	19.72	16	61.9	3	53.14	16	18.0	3	49.08	13	26.0	24
19.9	4.80	17	22.9	25	19.91	19	61.4	5	53.33	19	17.6	4	49.24	16	23.9	21
Mar. 1.9	5.02	22	20.7	22	20.13	22	60.8	6	53.55	22	17.0	6	49.44	20	22.1	18
11.9	5.28	26	19.0	17	20.38	25	60.1	7	53.79	24	16.3	7	49.67	23	20.7	14
21.9	5.57	29	17.8	12	20.65	27	59.3	8	54.06	27	15.5	8	49.93	26	19.7	10
31.8	5.88	31	17.1	7	20.94	29	58.3	10	54.35	29	14.5	10	50.22	29	19.2	5
Apr. 10.8	6.22	34	17.0	1	21.24	30	57.2	11	54.65	30	13.4	11	50.53	31	19.2	0
20.8	6.57	35	17.4	4	21.56	32	56.0	12	54.97	32	12.2	12	50.85	32	19.8	6
30.7	6.93	36	18.4	10	21.89	33	54.7	13	55.30	33	10.9	13	51.18	33	20.9	11
May 10.7	7.29	36	20.0	16	22.23	34	53.4	13	55.63	33	9.6	13	51.51	33	22.4	15
20.7	7.63	34	22.0	20	22.56	33	52.1	13	55.96	33	8.3	13	51.84	33	24.4	20
30.7	7.95	32	24.4	24	22.87	31	50.9	12	56.28	32	7.0	13	52.15	31	26.7	23
June 9.6	8.25	30	27.1	27	23.17	30	49.8	11	56.58	30	5.8	12	52.44	29	29.3	26
19.6	8.52	27	30.1	30	23.45	28	48.8	10	56.86	28	4.8	10	52.70	26	32.0	27
29.6	8.74	22	33.3	32	23.70	25	47.9	9	57.11	25	3.9	9	52.92	22	34.9	29
July 9.6	8.92	18	36.5	32	23.91	21	47.2	7	57.32	21	3.2	7	53.10	18	37.9	30
19.5	9.04	12	39.7	32	24.08	17	46.7	5	57.49	17	2.6	6	53.24	14	40.9	30
29.5	9.11	7	42.9	32	24.21	13	46.3	4	57.62	13	2.2	4	53.33	9	43.8	29
Aug. 8.5	9.13	2	46.0	31	24.29	8	46.1	2	57.70	8	2.0	2	53.37	4	46.5	27
18.4	9.09	4	48.9	29	24.32	3	46.1	0	57.73	3	2.0	0	53.37	0	49.0	25
28.4	9.01	8	51.5	26	24.30	2	46.3	2	57.71	2	2.2	2	53.32	5	51.3	23
Sept. 7.4	8.88	13	53.8	23	24.24	6	46.5	2	57.65	6	2.4	2	53.22	10	53.3	20
17.4	8.71	17	55.8	20	24.14	10	46.8	3	57.56	9	2.7	3	53.08	14	55.0	17
27.3	8.51	20	57.3	15	24.02	12	47.2	4	57.44	12	3.1	4	52.92	16	56.3	13
Oct. 7.3	8.29	22	58.4	11	23.88	14	47.6	4	57.30	14	3.5	4	52.74	18	57.2	9
17.3	8.05	24	59.1	7	23.73	15	48.0	4	57.15	15	3.9	4	52.55	19	57.8	6
27.3	7.81	24	59.4	3	23.57	16	48.4	4	56.99	16	4.3	4	52.35	20	58.0	2
Nov. 6.2	7.58	23	59.1	3	23.42	15	48.7	3	56.84	15	4.6	3	52.16	19	57.7	3
16.2	7.36	22	58.3	8	23.29	13	49.0	3	56.71	13	4.9	3	51.98	18	57.0	7
26.2	7.17	19	57.1	12	23.19	10	49.2	2	56.61	10	5.1	2	51.83	15	55.9	11
Dec. 6.1	7.01	16	55.5	16	23.12	7	49.4	2	56.54	7	5.3	2	51.70	13	54.4	15
16.1	6.89	12	53.5	20	23.08	4	49.5	1	56.50	4	5.4	1	51.61	9	52.6	18
26.1	6.81	8	51.1	24	23.08	0	49.5	0	56.50	0	5.4	0	51.55	6	50.5	21
36.1	6.77	4	48.4	27	23.11	3	49.5	0	56.53	3	5.4	0	51.53	2	48.2	23
Sec δ, Tan δ	1.305		+0.838		1.054		−0.334		1.052		−0.327		1.156		+0.579	
Mean Place	6ˢ.337		39″.71		20ˢ.569		50″.97		53ˢ.992		7″.07		50ˢ.492		39″.82	
D′ψ a, Dω a	−0.02		−0.03		+0.01		+0.01		+0.01		+0.01		−0.01		−0.02	
Dψ δ, Dω δ	+0.2		−0.8		+0.2		−0.8		+0.2		−0.8		+0.2		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**θ Cephei.** Mag. 4.3				**ε Delphini.** Mag. 4.0				**Groombridge 3241.** Mag. 6.4				**α Indi.** Mag. 3.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 20 28		° ′ +62 41		h m 20 29		° ′ +11 0		h m 20 30		° ′ +72 13		h m 20 31		° ′ −47 35	
	s		″		s		″		s		″		s		″	
Jan. 1.1	4.13		65.4		2.02		18.0		18.45		74.6		25.50		59.9	
11.0	3.99	14	62.3	31	2.05	3	16.4	16	18.17	28	71.6	30	25.55	5	58.1	18
21.0	3.94	5	59.1	32	2.12	7	14.8	16	18.02	15	68.3	33	25.66	11	56.2	19
31.0	3.97	3	55.8	33	2.22	10	13.3	15	18.00	2	64.9	34	25.81	15	54.2	20
Feb. 10.0	4.09	12	52.5	33	2.35	13	11.9	14	18.11	11	61.6	33	26.01	20	52.2	20
19.9	4.29	20	49.4	31	2.51	16	10.7	12	18.36	25	58.4	32	26.26	25	50.1	21
Mar. 1.9	4.57	28	46.6	28	2.70	19	9.7	10	18.73	37	55.5	29	26.55	29	48.1	20
11.9	4.92	35	44.3	23	2.92	22	9.1	6	19.21	48	53.0	25	26.87	32	46.1	20
21.9	5.33	41	42.5	18	3.17	25	8.8	3	19.79	58	51.0	20	27.23	36	44.2	19
31.8	5.80	47	41.2	13	3.44	27	8.9	1	20.44	65	49.6	14	27.61	38	42.4	18
Apr. 10.8	6.30	50	40.5	7	3.72	28	9.4	5	21.14	70	48.8	8	28.02	41	40.7	17
20.8	6.82	52	40.5	0	4.02	30	10.2	8	21.88	74	48.6	2	28.45	43	39.3	14
30.7	7.35	53	41.2	7	4.33	31	11.4	12	22.63	75	49.1	5	28.89	44	38.1	12
May 10.7	7.87	52	42.5	13	4.64	31	13.0	16	23.36	73	50.2	11	29.33	44	37.1	10
20.7	8.37	50	44.3	18	4.95	31	14.8	18	24.06	70	51.9	17	29.77	44	36.4	7
30.7	8.83	46	46.6	23	5.25	30	16.8	20	24.71	65	54.1	22	30.20	43	36.0	4
June 9.6	9.25	42	49.3	27	5.53	28	18.9	21	25.28	57	56.8	27	30.61	41	36.0	0
19.6	9.61	36	52.4	31	5.78	25	21.1	22	25.75	47	59.8	30	30.99	38	36.2	2
29.6	9.90	29	55.8	34	6.01	23	23.4	23	26.12	37	63.1	33	31.33	34	36.7	5
July 9.6	10.11	21	59.4	36	6.20	19	25.6	22	26.38	26	66.6	35	31.62	29	37.5	8
19.5	10.24	13	63.0	36	6.35	15	27.8	22	26.52	14	70.2	36	31.85	23	38.6	11
29.5	10.29	5	66.6	36	6.46	11	29.8	20	26.54	2	73.9	37	32.02	17	39.9	13
Aug. 8.5	10.25	4	70.2	36	6.52	6	31.7	19	26.43	11	77.6	37	32.12	10	41.4	15
18.4	10.13	12	73.6	34	6.54	2	33.4	17	26.21	22	81.1	35	32.16	4	42.9	15
28.4	9.94	19	76.8	32	6.52	2	34.8	14	25.88	33	84.4	33	32.14	2	44.5	16
Sept. 7.4	9.67	27	79.7	29	6.46	6	36.0	12	25.44	44	87.4	30	32.06	8	46.1	16
17.4	9.34	33	82.3	26	6.36	10	36.9	9	24.91	53	90.1	27	31.93	13	47.6	15
27.3	8.96	38	84.5	22	6.23	13	37.6	7	24.31	60	92.4	23	31.75	18	48.9	13
Oct. 7.3	8.54	42	86.2	17	6.09	14	38.0	4	23.65	66	94.3	19	31.54	21	50.0	11
17.3	8.10	44	87.4	12	5.94	15	38.2	2	22.94	71	95.7	14	31.31	23	50.8	8
27.3	7.64	46	88.1	7	5.78	16	38.1	1	22.21	73	96.6	9	31.07	24	51.3	5
Nov. 6.2	7.18	46	88.2	1	5.63	15	37.8	3	21.47	74	96.9	3	30.84	23	51.4	1
16.2	6.74	44	87.7	5	5.49	14	37.2	6	20.75	72	96.6	3	30.64	20	51.2	2
26.2	6.33	41	86.7	10	5.38	11	36.3	9	20.07	68	95.7	9	30.46	18	50.7	5
Dec. 6.1	5.96	37	85.2	15	5.29	9	35.2	11	19.44	63	94.3	14	30.32	14	49.8	9
16.1	5.64	32	83.2	20	5.23	6	34.0	12	18.89	55	92.4	19	30.23	9	48.6	12
26.1	5.39	25	80.7	25	5.20	3	32.6	14	18.43	46	90.0	24	30.19	4	47.1	15
36.1	5.21	18	77.8	29	5.21	1	31.0	16	18.08	35	87.1	29	30.21	2	45.4	17
Sec δ, Tan δ	2.180		+1.938		1.019		+0.194		+3.278		+3.122		1.483		−1.095	
Mean Place	7s.469		65″.02		3s.411		24″.93		23s.478		73″.15		27s.041		44″.70	
D′ψ α, Dω α	−0.04		−0.08		0.00		−0.01		−0.07		−0.13		+0.02		+0.04	
Dψ δ, Dω δ	+0.2		−0.8		+0.2		−0.8		+0.2		−0.8		+0.2		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**β Delphini.** Mag. 3.7				**υ Capricorni.** Mag. 5.3				**α Delphini.** Mag. 3.9				**β Pavonis.** Mag. 3.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	20 33		+14 17		20 35		−18 26		20 35		+15 36		20 37		−66 30	
	s		″		s		″		s		″		s		″	
Jan. 1.1	26.78	2	24.6	17	4.68	5	55.3	1	34.41	2	11.3	18	5.58	1	77.5	27
11.1	26.80	6	22.9	18	4.73	8	55.2	2	34.43	6	9.5	18	5.59	10	74.8	29
21.0	26.86	9	21.1	17	4.81	12	55.0	2	34.49	9	7.7	18	5.69	20	71.9	29
31.0	26.95	13	19.4	16	4.93	15	54.8	3	34.58	12	5.9	16	5.89	28	69.0	30
Feb. 10.0	27.08	16	17.8	14	5.08	18	54.5	5	34.70	15	4.3	14	6.17	36	66.0	29
19.9	27.24	19	16.4	11	5.26	21	54.0	6	34.85	19	2.9	12	6.53	43	63.1	28
Mar. 1.9	27.43	21	15.3	8	5.47	23	53.4	8	35.04	22	1.7	9	6.96	50	60.3	27
11.9	27.64	24	14.5	4	5.70	26	52.6	9	35.26	24	0.8	5	7.46	56	57.6	24
21.9	27.88	27	14.1	0	5.96	28	51.7	11	35.50	27	0.3	1	8.02	61	55.2	21
31.8	28.15	29	14.1	4	6.24	30	50.6	12	35.77	28	0.2	4	8.63	65	53.1	18
Apr. 10.8	28.44	30	14.5	8	6.54	32	49.4	13	36.05	30	0.6	8	9.28	67	51.3	15
20.8	28.74	31	15.3	12	6.86	33	48.1	13	36.35	31	1.4	12	9.95	69	49.8	11
30.8	29.05	31	16.5	15	7.19	33	46.8	14	36.66	32	2.6	15	10.64	70	48.7	8
May 10.7	29.36	31	18.0	18	7.52	33	45.4	14	36.98	31	4.1	18	11.34	69	47.9	3
20.7	29.67	30	19.8	21	7.85	32	44.0	13	37.29	30	5.9	21	12.03	67	47.6	1
30.7	29.97	29	21.9	22	8.17	31	42.7	12	37.59	28	8.0	23	12.70	63	47.7	5
June 9.6	30.26	26	24.1	24	8.48	29	41.5	11	37.87	26	10.3	24	13.33	58	48.2	10
19.6	30.52	23	26.5	24	8.77	26	40.4	9	38.13	23	12.7	24	13.91	51	49.2	13
29.6	30.75	19	28.9	24	9.03	22	39.5	8	38.36	20	15.1	24	14.42	44	50.5	16
July 9.6	30.94	15	31.3	23	9.25	18	38.7	6	38.56	16	17.5	24	14.86	35	52.1	19
19.5	31.09	11	33.6	22	9.43	13	38.1	4	38.72	11	19.9	23	15.21	25	54.0	22
29.5	31.20	7	35.8	20	9.56	9	37.7	2	38.83	6	22.2	21	15.46	14	56.2	23
Aug. 8.5	31.27	2	37.8	18	9.65	4	37.5	0	38.89	2	24.3	19	15.60	4	58.5	24
18.5	31.29	2	39.6	16	9.69	0	37.5	1	38.91	2	26.2	17	15.64	7	60.9	24
28.4	31.27	6	41.2	14	9.69	5	37.6	3	38.89	6	27.9	14	15.57	16	63.3	22
Sept. 7.4	31.21	10	42.6	11	9.64	8	37.9	4	38.83	10	29.3	12	15.41	25	65.5	20
17.4	31.11	13	43.7	8	9.56	11	38.3	4	38.73	12	30.5	9	15.16	33	67.5	18
27.3	30.98	15	44.5	6	9.45	14	38.7	4	38.61	15	31.4	6	14.83	39	69.3	14
Oct. 7.3	30.83	15	45.1	3	9.31	15	39.1	5	38.46	16	32.0	3	14.44	43	70.7	10
17.3	30.68	16	45.4	1	9.16	16	39.6	4	38.30	16	32.3	0	14.01	44	71.7	5
27.3	30.52	16	45.3	3	9.00	15	40.0	4	38.14	16	32.3	3	13.57	44	72.2	0
Nov. 6.2	30.36	14	45.0	6	8.85	13	40.4	3	37.98	14	32.0	6	13.13	42	72.2	6
16.2	30.22	12	44.4	9	8.72	11	40.7	2	37.84	12	31.4	9	12.71	37	71.6	10
26.2	30.10	9	43.5	11	8.61	8	40.9	2	37.72	10	30.5	11	12.34	30	70.6	15
Dec. 6.2	30.01	7	42.4	13	8.53	5	41.1	1	37.62	7	29.4	14	12.04	23	69.1	19
16.1	29.94	3	41.1	15	8.48	1	41.2	0	37.55	3	28.0	16	11.81	14	67.2	23
26.1	29.91	0	39.6	17	8.47	3	41.2	0	37.52	0	26.4	17	11.67	5	64.9	26
36.1	29.91		37.9		8.50		41.2		37.52		24.7		11.62		62.3	
Sec δ, Tan δ	1.032		+0.255		1.054		−0.333		1.038		+0.279		2.510		−2.302	
Mean Place	28s.198		30″.79		5s.933		43″.67		35s.841		17″.17		7s.908		60″.70	
D′ψ α, Dω α	−0.01		−0.01		+0.01		+0.01		−0.01		−0.01		+0.05		+0.10	
Dψ δ, Dω δ	+0.2		−0.8		+0.2		−0.8		+0.2		−0.8		+0.3		−0.8	

Mean Solar Date.	*α* Cygni. Mag. 1.3				*δ* Delphini. Mag. 4.5				*ψ* Capricorni. Mag. 4.3				*γ* Delphini *seq.* Mag. 4.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 20 38 s		° ′ +44 57 ″		h m 20 39 s		° ′ +14 45 ″		h m 20 40 s		° ′ −25 34 ″		h m 20 42 s		° ′ +15 48 ″	
Jan. 1.1	25.84	5	67.3	27	22.43	2	36.5	17	55.58	4	75.2	5	35.90	2	31.2	18
11.1	25.79	0	64.6	29	22.45	5	34.8	18	55.62	8	74.7	6	35.92	5	29.4	18
21.0	25.79	6	61.7	30	22.50	9	33.0	17	55.70	12	74.1	7	35.97	8	27.6	17
31.0	25.85	11	58.7	29	22.59	12	31.3	16	55.82	15	73.4	8	36.05	11	25.9	17
Feb. 10.0	25.96	15	55.8	27	22.71	15	29.7	14	55.97	18	72.6	9	36.16	15	24.2	15
19.9	26.11	20	53.1	24	22.86	18	28.3	11	56.15	21	71.7	11	36.31	18	22.7	12
Mar. 1.9	26.31	25	50.7	20	23.04	21	27.2	8	56.36	24	70.6	12	36.49	21	21.5	8
11.9	26.56	29	48.7	15	23.25	24	26.4	4	56.60	27	69.4	12	36.70	24	20.7	5
21.9	26.85	32	47.2	10	23.49	27	26.0	1	56.87	29	68.2	13	36.94	26	20.2	1
31.8	27.17	35	46.2	4	23.76	28	25.9	3	57.16	32	66.9	13	37.20	28	20.1	3
Apr. 10.8	27.52	37	45.8	2	24.04	30	26.2	8	57.48	33	65.6	14	37.48	30	20.4	8
20.8	27.89	38	46.0	8	24.34	31	27.0	12	57.81	34	64.2	14	37.78	31	21.2	11
30.8	28.27	38	46.8	14	24.65	31	28.2	15	58.15	35	62.8	13	38.09	32	22.3	15
May 10.7	28.65	37	48.2	19	24.96	31	29.7	18	58.50	34	61.5	13	38.41	31	23.8	18
20.7	29.02	35	50.1	23	25.27	31	31.5	20	58.84	34	60.2	12	38.72	30	25.6	21
30.7	29.37	33	52.4	26	25.58	29	33.5	23	59.18	33	59.0	10	39.02	29	27.7	23
June 9.6	29.70	30	55.0	30	25.87	26	35.8	24	59.51	30	58.0	8	39.31	27	30.0	24
19.6	30.00	25	58.0	32	26.13	23	38.2	24	59.81	27	57.2	6	39.58	24	32.4	24
29.6	30.25	20	61.2	33	26.36	20	40.6	24	60.08	24	56.6	4	39.82	20	34.8	24
July 9.6	30.45	15	64.5	34	26.56	16	43.0	24	60.32	20	56.2	2	40.02	16	37.2	24
19.5	30.60	9	67.9	34	26.72	12	45.4	22	60.52	15	56.0	1	40.18	12	39.6	23
29.5	30.69	3	71.3	33	26.84	7	47.6	21	60.67	10	56.1	2	40.30	7	41.9	21
Aug. 8.5	30.72	2	74.6	31	26.91	2	49.7	19	60.77	5	56.3	4	40.37	2	44.0	20
18.5	30.70	7	77.7	29	26.93	2	51.6	16	60.82	0	56.7	5	40.39	2	46.0	17
28.4	30.63	13	80.6	26	26.91	6	53.2	14	60.82	5	57.2	6	40.37	5	47.7	15
Sept. 7.4	30.50	17	83.2	23	26.85	9	54.6	11	60.77	9	57.8	7	40.32	9	49.2	12
17.4	30.33	21	85.5	19	26.76	12	55.7	9	60.68	11	58.5	7	40.23	12	50.4	9
27.3	30.12	23	87.4	14	26.64	14	56.6	6	60.57	14	59.2	6	40.11	14	51.3	6
Oct. 7.3	29.89	25	88.8	10	26.50	16	57.2	3	60.43	16	59.8	6	39.97	16	51.9	4
17.3	29.64	26	89.8	5	26.34	16	57.5	0	60.27	16	60.4	5	39.81	16	52.3	0
27.3	29.38	26	90.3	1	26.18	16	57.5	3	60.11	16	60.9	4	39.65	16	52.3	3
Nov. 6.2	29.12	25	90.4	5	26.02	14	57.2	6	59.95	14	61.3	2	39.49	14	52.0	5
16.2	28.87	22	89.9	10	25.88	12	56.6	8	59.81	12	61.5	1	39.35	13	51.5	8
26.2	28.65	20	88.9	15	25.76	10	55.8	11	59.69	9	61.6	0	39.22	10	50.7	11
Dec. 6.2	28.45	16	87.4	19	25.66	7	54.7	13	59.60	6	61.6	2	39.12	7	49.6	14
16.1	28.29	12	85.5	23	25.59	4	53.4	15	59.54	2	61.4	3	39.05	4	48.2	16
26.1	28.17	8	83.2	26	25.55	0	51.9	17	59.52	2	61.1	4	39.01	1	46.6	17
36.1	28.09		80.6		25.55		50.2		59.54		60.7		39.00		44.9	
Sec δ, Tan δ	1.414		+0.999		1.034		+0.263		1.109		−0.479		1.039		+0.283	
Mean Place	27ˢ.940		68″.26		23ˢ.841		42″.38		56ˢ.825		62″.42		37ˢ.315		36″.71	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	−0.02		−0.04		−0.01		−0.01		+0.01		+0.02		−0.01		−0.01	
$D_\psi\,\delta$, $D_\omega\,\delta$	+0.3		−0.8		+0.3		−0.8		+0.3		−0.8		+0.3		−0.8	

[Eph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ε Cygni.** Mag. 2.6				**ε Aquarii.** Mag. 3.8				**η Cephei.** Mag. 3.6				**μ Aquarii.** Mag. 4.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	20 42		+33 38		20 42		− 9 48		20 43		+61 29		20 47		− 9 18	
	s		″		s		″		s		″		s		″	
Jan. 1.1	39.73		35.5		56.83		63.6		28.15		63.9		56.54		47.7	
11.1	39.71	2	33.1	24	56.86	3	64.0	4	28.00	15	61.0	29	56.57	3	48.2	5
21.0	39.73	2	30.6	25	56.93	7	64.4	4	27.93	7	57.8	32	56.63	6	48.6	4
31.0	39.80	7	28.0	26	57.03	10	64.7	3	27.94	1	54.5	33	56.73	10	48.9	3
Feb. 10.0	39.91	11	25.5	25	57.17	14	64.8	1	28.03	9	51.3	32	56.86	13	49.0	1
19.9	40.06	15	23.2	23	57.33	16	64.8	0	28.20	17	48.3	30	57.02	16	49.0	0
Mar. 1.9	40.24	18	21.2	20	57.52	19	64.6	2	28.44	24	45.5	28	57.20	18	48.8	2
11.9	40.46	22	19.6	16	57.74	22	64.2	4	28.75	31	43.1	24	57.41	21	48.5	3
21.9	40.72	26	18.5	11	57.98	24	63.6	6	29.13	38	41.2	19	57.65	24	47.9	6
31.8	41.01	29	17.8	7	58.25	27	62.8	8	29.56	43	39.8	14	57.92	27	47.1	8
Apr. 10.8	41.32	31	17.7	1	58.54	29	61.8	10	30.04	48	39.0	8	58.20	28	46.1	10
20.8	41.64	32	18.1	4	58.84	30	60.6	12	30.54	50	38.9	1	58.50	30	44.9	12
30.8	41.98	34	19.0	9	59.15	31	59.3	13	31.05	51	39.4	5	58.81	31	43.5	14
May 10.7	42.32	34	20.4	14	59.47	32	57.8	15	31.56	51	40.5	11	59.13	32	42.0	15
20.7	42.66	34	22.3	19	59.79	32	56.2	16	32.06	50	42.2	17	59.45	32	40.4	16
30.7	42.99	33	24.6	23	60.10	31	54.6	16	32.53	47	44.4	22	59.77	32	38.8	16
June 9.6	43.30	31	27.1	25	60.40	30	53.1	15	32.96	43	47.1	27	60.07	30	37.2	16
19.6	43.58	28	29.9	28	60.68	28	51.6	15	33.33	37	50.2	31	60.35	28	35.7	15
29.6	43.82	24	32.9	30	60.93	25	50.2	14	33.64	31	53.5	33	60.61	26	34.3	14
July 9.6	44.02	20	36.0	31	61.15	22	49.0	12	33.88	24	57.0	35	60.83	22	33.0	13
19.5	44.17	15	39.1	31	61.33	18	47.9	11	34.04	16	60.7	37	61.01	18	31.9	11
29.5	44.28	11	42.1	30	61.47	14	47.0	9	34.12	8	64.4	37	61.15	14	30.9	10
Aug. 8.5	44.34	6	45.1	30	61.56	9	46.3	7	34.12	0	68.0	36	61.25	10	30.1	8
18.5	44.34	0	47.9	28	61.61	5	45.7	6	34.05	7	71.5	35	61.30	5	29.5	6
28.4	44.30	4	50.4	25	61.61	0	45.3	4	33.90	15	74.8	33	61.30	0	29.1	4
Sept. 7.4	44.22	8	52.6	22	61.57	4	45.1	2	33.68	22	77.9	31	61.26	4	28.9	2
17.4	44.09	13	54.5	19	61.49	8	45.1	0	33.39	29	80.6	27	61.19	7	28.8	1
27.3	43.93	16	56.1	16	61.38	11	45.2	1	33.05	34	82.9	23	61.09	10	28.9	1
Oct. 7.3	43.75	18	57.3	12	61.25	13	45.4	2	32.67	38	84.8	19	60.97	12	29.1	2
17.3	43.55	20	58.1	8	61.11	14	45.7	3	32.26	41	86.2	14	60.83	14	29.4	3
27.3	43.35	20	58.5	4	60.97	14	46.0	3	31.83	43	87.1	9	60.68	15	29.7	3
Nov. 6.2	43.15	20	58.4	1	60.83	14	46.4	4	31.40	43	87.5	4	60.54	14	30.1	4
16.2	42.96	19	57.9	5	60.70	13	46.8	4	30.98	42	87.3	2	60.41	13	30.5	4
26.2	42.79	17	57.0	9	60.59	11	47.3	5	30.59	39	86.5	8	60.30	11	31.0	5
Dec. 6.2	42.65	14	55.6	14	60.51	8	47.8	5	30.23	36	85.2	13	60.22	8	31.5	5
16.1	42.54	11	53.9	17	60.46	5	48.3	5	29.91	32	83.4	18	60.16	6	32.0	5
26.1	42.46	8	51.9	20	60.44	2	48.7	4	29.65	26	81.1	23	60.14	2	32.5	5
36.1	42.42	4	49.6	23	60.45	1	49.1	4	29.46	19	78.3	28	60.15	1	33.0	5
Sec δ, Tan δ	1.201		+0.665		1.015		−0.173		2.096		+1.842		1.013		−0.164	
Mean Place	41ˢ.459		37″.90		58ˢ.057		53″.41		31ˢ.328		62″.26		57ˢ.755		37″.69	
D′ψ α, Dω α	−0.01		−0.03		0.00		+0.01		−0.04		−0.08		0.00		+0.01	
Dψ δ, Dω δ	+0.3		−0.8		+0.3		−0.8		+0.3		−0.8		+0.3		−0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Indi. Mag. 3.7				32 Vulpeculæ. Mag. 5.2				220 Draconis (*Heis*). Mag. 5.6				ν Cygni. Mag. 4.0			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	20 47		−58 46		20 50		+27 43		20 51		+80 13		20 53		+40 49	
	s		″		s		″		s		″		s		″	
Jan. 1.1	59.38	1	75.5	23	49.53	1	31.5	22	25.35	70	39.9	28	53.84	5	53.6	26
11.1	59.39	8	73.2	25	49.52	2	29.3	23	24.65	48	37.1	31	53.79	1	51.0	27
21.0	59.47	14	70.7	26	49.54	6	27.0	23	24.17	24	34.0	32	53.78	4	48.3	28
31.0	59.61	21	68.1	27	49.60	10	24.7	22	23.93	1	30.8	33	53.82	9	45.5	27
Feb. 10.0	59.82	27	65.4	27	49.70	14	22.5	20	23.94	25	27.5	32	53.91	14	42.8	26
20.0	60.09	33	62.7	26	49.84	18	20.5	18	24.19	49	24.3	30	54.05	18	40.2	23
Mar. 1.9	60.42	38	60.1	25	50.02	21	18.7	14	24.68	71	21.3	27	54.23	22	37.9	19
11.9	60.80	42	57.6	24	50.23	24	17.3	10	25.39	90	18.6	23	54.45	26	36.0	15
21.9	61.22	47	55.2	22	50.47	27	16.3	5	26.29	105	16.3	18	54.71	30	34.5	9
31.8	61.69	50	53.0	20	50.74	29	15.8	0	27.34	117	14.5	11	55.01	32	33.6	4
Apr. 10.8	62.19	52	51.0	17	51.03	31	15.8	5	28.51	124	13.4	5	55.33	34	33.2	1
20.8	62.71	55	49.3	13	51.34	32	16.3	9	29.75	128	12.9	1	55.67	36	33.3	7
30.8	63.26	56	48.0	10	51.66	33	17.2	14	31.03	127	13.0	7	56.03	37	34.0	13
May 10.7	63.82	55	47.0	6	51.99	33	18.6	18	32.30	121	13.7	13	56.40	36	35.3	18
20.7	64.37	54	46.4	3	52.32	32	20.4	22	33.51	112	15.0	18	56.76	35	37.1	22
30.7	64.91	51	46.1	1	52.64	30	22.6	25	34.63	100	16.8	23	57.11	33	39.3	25
June 9.7	65.42	48	46.2	5	52.94	28	25.1	27	35.63	85	19.1	28	57.44	30	41.8	29
19.6	65.90	43	46.7	9	53.22	25	27.8	28	36.48	68	21.9	31	57.74	26	44.7	31
29.6	66.33	37	47.6	13	53.47	21	30.6	29	37.16	48	25.0	34	58.00	22	47.8	32
July 9.6	66.70	30	48.9	15	53.68	16	33.5	29	37.64	27	28.4	35	58.22	17	51.0	33
19.5	67.00	23	50.4	18	53.84	12	36.4	28	37.91	7	31.9	36	58.39	11	54.3	33
29.5	67.23	15	52.2	19	53.96	7	39.2	27	37.98	14	35.5	37	58.50	6	57.6	32
Aug. 8.5	67.38	7	54.1	21	54.03	2	41.9	25	37.84	35	39.2	36	58.56	1	60.8	31
18.5	67.45	2	56.2	21	54.05	2	44.4	23	37.49	55	42.8	35	58.57	4	63.9	28
28.4	67.43	10	58.3	21	54.03	6	46.7	21	36.94	74	46.3	33	58.53	9	66.7	26
Sept. 7.4	67.33	17	60.4	19	53.97	10	48.8	18	36.20	90	49.6	30	58.44	14	69.3	22
17.4	67.16	23	62.3	17	53.87	14	50.6	14	35.30	105	52.6	27	58.30	17	71.5	19
27.4	66.93	27	64.0	14	53.73	16	52.0	11	34.25	118	55.3	23	58.13	20	73.4	15
Oct. 7.3	66.66	31	65.4	11	53.57	18	53.1	7	33.07	127	57.6	18	57.93	22	74.9	11
17.3	66.35	32	66.5	7	53.39	18	53.8	3	31.80	134	59.4	13	57.71	23	76.0	6
27.3	66.03	32	67.2	2	53.21	18	54.1	1	30.46	137	60.7	7	57.48	23	76.6	1
Nov. 6.2	65.71	30	67.4	3	53.03	17	54.0	5	29.09	137	61.4	2	57.25	22	76.7	3
16.2	65.41	27	67.1	7	52.86	15	53.5	8	27.72	133	61.6	4	57.03	21	76.4	8
26.2	65.14	23	66.4	11	52.71	13	52.7	12	26.39	126	61.2	10	56.82	18	75.6	13
Dec. 6.2	64.91	17	65.3	15	52.58	10	51.5	16	25.13	114	60.2	15	56.64	15	74.3	17
16.1	64.74	10	63.8	19	52.48	7	49.9	19	23.99	100	58.7	20	56.49	11	72.6	21
26.1	64.64	3	61.9	22	52.41	4	48.0	21	22.99	82	56.7	26	56.38	8	70.5	24
36.1	64.61		59.7		52.37		45.9		22.17		54.1		56.30		68.1	
Sec δ, Tan δ	1.930		−1.650		1.130		+0.526		5.891		+5.806		1.321		+0.864	
Mean Place	61ˢ.131		58″.65		51ˢ.112		34″.48		34ˢ.234		35″.89		55ˢ.747		54″.05	
D′ψ α, Dω α	+0.03		+0.07		−0.01		−0.02		−0.11		−0.26		−0.02		−0.04	
Dψ δ, Dω δ	+0.3		−0.7		+0.3		−0.7		+0.3		−0.7		+0.3		−0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Octantis. Mag. 5.2				γ Microscopii. Mag. 4.7				θ Capricorni. Mag. 4.2				ξ Cygni. Mag. 3.9			
	Right Ascension.		Declination S.		Right Ascension		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	20 54		−77 21		20 55		−32 35		21 1		−17 34		21 1		+43 34	
	s		″		s		″		s		″		s		″	
Jan. 1.1	9.21	15	43.2	30	56.30	3	68.3	9	2.35	2	56.8	1	43.96	7	50.1	26
11.1	9.06	3	40.2	33	56.33	7	67.4	10	2.37	6	56.7	1	43.89	2	47.5	28
21.0	9.09	20	36.9	34	56.40	10	66.4	12	2.43	9	56.6	2	43.87	3	44.7	28
31.0	9.29	36	33.5	34	56.50	14	65.2	13	2.52	12	56.4	4	43.90	8	41.9	28
Feb. 10.0	9.65	52	30.1	34	56.64	18	63.9	14	2.64	15	56.0	6	43.98	12	39.1	27
20.0	10.17	66	26.7	32	56.82	21	62.5	15	2.79	18	55.4	7	44.10	17	36.4	24
Mar. 1.9	10.83	79	23.5	30	57.03	24	61.0	16	2.97	21	54.7	8	44.27	22	34.0	20
11.9	11.62	91	20.5	28	57.27	27	59.4	16	3.18	24	53.9	10	44.49	26	32.0	16
21.9	12.53	100	17.7	25	57.54	30	57.8	16	3.42	26	52.9	12	44.75	30	30.4	11
31.8	13.53	108	15.2	21	57.84	32	56.2	17	3 68	29	51.7	13	45.05	33	29.3	5
Apr. 10.8	14.61	114	13.1	17	58.16	34	54.5	16	3.97	31	50.4	14	45.38	35	28.8	0
20.8	15.75	117	11.4	12	58.50	36	52.9	15	4.28	32	49.0	15	45.73	37	28.8	6
30.8	16.92	119	10.2	8	58.86	37	51.4	14	4.60	33	47.5	15	46.10	38	29.4	11
May 10.7	18.11	118	9.4	3	59.23	37	50.0	12	4.93	33	46.0	15	46.48	38	30.5	17
20.7	19.29	115	9.1	2	59.60	37	48.8	11	5 26	33	44.5	15	46.86	37	32.2	22
30.7	20.44	109	9.3	6	59.97	35	47.7	9	5.59	32	43.0	14	47.23	34	34.4	25
June 9.7	21.53	101	9.9	11	60.32	33	46.8	6	5.91	30	41.6	13	47.57	31	36.9	28
19.6	22.54	90	11.0	15	60.65	30	46.2	4	6.21	27	40.3	11	47.88	27	39.7	31
29.6	23.44	77	12.5	19	60.95	26	45.8	1	6.48	24	39.2	9	48.15	23	42.8	33
July 9.6	24.21	61	14.4	22	61.21	22	45.7	1	6.72	21	38.3	7	48.38	18	46.1	34
19.5	24.82	44	16.6	25	61.43	18	45.8	4	6.93	16	37.6	6	48.56	13	49.5	33
29.5	25.26	26	19.1	27	61.61	12	46.2	6	7.09	11	37.0	3	48.69	7	52.8	33
Aug. 8.5	25.52	8	21.8	27	61.73	7	46.8	7	7.20	6	36.7	1	48.76	1	56.1	32
18.5	25.60	11	24.5	27	61.80	1	47.5	9	7.26	2	36.6	1	48.77	4	59.3	30
28.4	25.49	29	27.2	26	61.81	3	48.4	10	7.28	2	36.7	2	48.73	9	62.3	27
Sept. 7.4	25.20	46	29.8	24	61.78	8	49.4	10	7.26	6	36.9	3	48.64	14	65.0	24
17.4	24.74	60	32.2	21	61.70	12	50.4	10	7.20	10	37.2	4	48.50	18	67.4	20
27.4	24.14	72	34.3	17	61.58	15	51.4	9	7.10	12	37.6	5	48.32	20	69.4	17
Oct. 7.3	23.42	81	36.0	12	61.43	16	52.3	8	6.98	14	38.1	5	48.12	23	71.1	12
17.3	22.61	86	37.2	6	61.27	17	53.1	7	6.84	15	38.6	5	47.89	24	72.3	8
27.3	21.75	87	37.8	1	61.10	17	53.8	5	6.69	14	39.1	5	47.65	24	73.1	3
Nov. 6.2	20.88	85	37.9	5	60.93	16	54.3	2	6.55	13	39.6	4	47.41	23	73.4	3
16.2	20.03	78	37.4	11	60.77	14	54.5	0	6.42	12	40.0	3	47.18	22	73.1	7
26.2	19.25	69	36.3	17	60.63	11	54.5	2	6.30	10	40.3	3	46.96	20	72.4	12
Dec. 6.2	18.56	56	34.6	21	60.52	7	54.3	4	6.20	6	40.6	2	46.76	17	71.2	16
16.1	18.00	41	32.5	26	60.45	4	53.9	6	6.14	3	40.8	1	46.59	13	69.6	21
26.1	17.59	26	29.9	29	60.41	0	53.3	9	6.11	0	40.9	0	46.46	10	67.5	24
36.1	17.33		27.0		60.41		52.4		6.11		40.9		46.36		65.1	
Sec δ, Tan δ	4.569		−4.459		1.187		−0.639		1.049		−0.317		1.380		+0.952	
Mean Place	12ˢ.887		25″.20		57ˢ.513		54″.26		3ˢ.500		45″.26		45ˢ.949		49″.49	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	+0.09		+0.20		+0.01		+0.03		+0.01		+0.02		−0.02		−0.05	
$D_\psi\,\delta$, $D_\omega\,\delta$	+0.3		−0.7		+0.3		−0.7		+0.3		−0.7		+0.3		−0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**61 Cygni *pr.*** Mag. 5.6				**ν Aquarii.** Mag. 4.5				**Bradley 2777.** Mag. 5.9				**8 Piscis Australis.** Mag. 5.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	21 2		+38 18		21 4		−11 43		21 7		+77 46		21 8		−27 58	
	s		″		s		″		s		″		s		″	
Jan. 1.1	57.91	4	75.2	24	50.23	1	38.2	3	8.75	59	30.9	27	6.83	1	42.5	6
11.1	57.87	0	72.8	25	50.24	5	38.5	2	8.16	42	28.2	30	6.84	5	41.9	8
21.0	57.87	5	70.3	26	50.29	8	38.7	1	7.74	23	25.2	32	6.89	9	41.1	9
31.0	57.92	10	67.7	25	50.37	11	38.8	0	7.51	4	22.0	33	6.98	12	40.2	10
Feb. 10.0	58.02	14	65.2	24	50.48	14	38.8	2	7.47	15	18.7	32	7.10	15	39.2	12
20.0	58.16	18	62.8	21	50.62	17	38.6	4	7.62	34	15.5	31	7.25	19	38.0	13
Mar. 1.9	58.34	22	60.7	17	50.79	20	38.2	5	7.96	52	12.4	28	7.44	22	36.7	14
11.9	58.56	26	59.0	13	50.99	23	37.7	7	8.48	68	9.6	24	7.66	25	35.3	15
21.9	58.82	29	57.7	8	51.22	26	37.0	10	9.16	82	7.2	19	7.91	28	33.8	16
31.9	59.11	33	56.9	3	51.48	28	36.0	12	9.98	93	5.3	13	8.19	30	32.2	16
Apr. 10.8	59.44	35	56.6	3	51.76	29	34.8	13	10.91	100	4.0	7	8.49	32	30.6	16
20.8	59.79	36	56.9	8	52.05	31	33.5	15	11.91	104	3.3	1	8.81	34	29.0	16
30.8	60.15	36	57.7	14	52.36	32	32.0	15	12.95	104	3.2	6	9.15	36	27.4	15
May 10.7	60.51	36	59.1	18	52.68	33	30.5	16	13.99	101	3.8	12	9.51	36	25.9	15
20.7	60.87	36	60.9	23	53.01	32	28.9	16	15.00	96	5.0	17	9.87	35	24.4	13
30.7	61.23	34	63.2	27	53.33	31	27.3	16	15.96	87	6.7	22	10.22	34	23.1	11
June 9.7	61.57	31	65.9	29	53.64	29	25.7	16	16.83	76	8.9	27	10.56	33	22.0	9
19.6	61.88	27	68.8	31	53.93	27	24.1	14	17.59	63	11.6	31	10.89	30	21.1	7
29.6	62.15	23	71.9	33	54.20	24	22.7	12	18.22	48	14.7	33	11.19	26	20.4	4
July 9.6	62.38	18	75.2	33	54.44	20	21.5	10	18.70	32	18.0	35	11.45	22	20.0	2
19.6	62.56	13	78.5	33	54.64	16	20.5	9	19.02	15	21.5	37	11.67	18	19.8	0
29.5	62.69	8	81.8	32	54.80	11	19.6	7	19.17	2	25.2	37	11.85	13	19.8	3
Aug. 8.5	62.77	3	85.0	31	54.91	7	18.9	5	19.15	19	28.9	37	11.98	8	20.1	5
18.5	62.80	3	88.1	29	54.98	2	18.4	3	18.96	35	32.6	36	12.06	3	20.6	6
28.4	62.77	7	91.0	26	55.00	2	18.1	1	18.61	50	36.2	34	12.09	2	21.2	8
Sept. 7.4	62.70	11	93.6	23	54.98	6	18.0	1	18.11	64	39.6	32	12.07	6	22.0	9
17.4	62.59	15	95.9	19	54.92	9	18.1	2	17.47	77	42.8	28	12.01	10	22.9	9
27.4	62.44	17	97.8	15	54.83	12	18.3	3	16.70	88	45.6	24	11.91	13	23.8	8
Oct. 7.3	62.27	19	99.3	11	54.71	13	18.6	4	15.82	96	48.0	20	11.78	15	24.6	8
17.3	62.08	21	100.4	7	54.58	14	19.0	4	14.86	102	50.0	15	11.63	16	25.4	7
27.3	61.87	21	101.1	2	54.44	14	19.4	4	13.84	106	51.5	10	11.47	16	26.1	5
Nov. 6.3	61.66	20	101.3	2	54.30	13	19.8	5	12.78	106	52.5	4	11.31	15	26.6	4
16.2	61.46	18	101.1	7	54.17	11	20.3	4	11.72	104	52.9	2	11.16	13	27.0	2
26.2	61.28	16	100.4	11	54.06	9	20.7	4	10.68	100	52.7	8	11.03	11	27.2	0
Dec. 6.2	61.12	13	99.3	16	53.97	7	21.1	4	9.68	92	51.9	13	10.92	8	27.2	2
16.1	60.99	10	97.7	19	53.90	4	21.5	4	8.76	81	50.6	19	10.84	4	27.0	4
26.1	60.89	6	95.8	22	53.86	0	21.9	3	7.95	68	48.7	24	10.80	1	26.6	6
36.1	60.83		93.6		53.86		22.2		7.27		46.3		10.79		26.0	
Sec δ, Tan δ	1.275		+0.790		1.021		−0.207		4.722		+4.615		1.132		−0.531	
Mean Place	59^s.725		75″.68		51^s.367		27″.91		15^s.766		25″ 54		7^s.953		29″.12	
D′ψ α, Dω α	−0.01		−0.04		0.00		+0.01		−0.08		−0.22		+0.01		+0.03	
Dψ δ, Dω δ	+0.3		−0.7		+0.3		−0.7		+0.3		−0.7		+0.3		−0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Cygni. Mag. 3.4				τ Cygni. Mag. 3.8				α Equulei. Mag. 4.1				σ Cygni. Mag. 4.3			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 21 9		° ′ +29 51		h m 21 11		° ′ +37 40		h m 21 11		° ′ + 4 53		h m 21 13		° ′ +39 1	
	s		″		s		″		s		″		s		″	
Jan. 1.1	12.40		68.9		17.30		25.1		27.30		8.8		58.09		47.7	
11.1	12.36	4	66.7	22	17.25	5	22.8	23	27.30	0	7.7	11	58.02	7	45.3	24
21.0	12.36	0	64.4	23	17.23	2	20.3	25	27.33	3	6.6	11	58.00	2	42.7	26
31.0	12.40	4	62.1	23	17.25	2	17.7	26	27.39	6	5.5	11	58.02	2	40.1	26
Feb. 10.0	12.48	8	59.8	23	17.32	7	15.1	26	27.48	9	4.5	10	58.09	7	37.5	26
20.0	12.60	12	57.7	21	17.43	11	12.7	24	27.61	13	3.7	8	58.20	11	35.0	25
Mar. 1.9	12.76	16	55.8	19	17.59	16	10.5	22	27.77	16	3.1	6	58.35	15	32.7	23
11.9	12.95	19	54.3	15	17.79	20	8.6	19	27.95	18	2.8	3	58.55	20	30.8	19
21.9	13.18	23	53.2	11	18.03	24	7.2	14	28.16	21	2 8	0	58.79	24	29.3	15
31.9	13.44	26	52.5	7	18.31	28	6.2	10	28.40	24	3.1	3	59.06	27	28.3	10
Apr. 10.8	13.72	28	52.3	2	18.61	30	5.8	4	28.67	27	3.7	6	59.37	31	27.8	5
20.8	14.03	31	52.6	3	18.94	33	5.9	1	28.96	29	4.6	9	59.70	33	27.8	0
30.8	14.36	33	53.4	8	19 29	35	6.5	6	29.26	30	5.9	13	60.05	35	28.4	6
May 10.7	14.69	33	54.7	13	19.64	35	7.7	12	29.57	31	7.4	15	60.41	36	29.5	11
20.7	15.03	34	56.4	17	20.00	36	9.4	17	29.89	32	9.1	17	60.77	36	31.1	16
30.7	15.36	33	58.5	21	20.35	35	11.5	21	30.20	31	11.0	19	61.13	36	33.2	21
June 9.7	15.68	32	60.9	24	20.68	33	14.0	25	30.50	30	13.1	21	61.47	34	35.7	25
19.6	15.97	29	63.6	27	20.99	31	16.8	28	30.78	28	15.2	21	61.78	31	38.4	27
29.6	16.23	26	66.4	28	21.26	27	19.8	30	31.04	26	17.3	21	62.06	28	41.4	30
July 9.6	16.46	23	69.3	29	21.49	23	22.9	31	31.27	23	19.3	20	62.30	24	44.6	32
19.6	16.64	18	72.3	30	21.68	19	26.1	32	31.47	20	21.2	19	62.49	19	47.8	32
29.5	16.78	14	75.2	29	21.82	14	29.3	32	31.62	15	23.0	18	62.63	14	51.0	32
Aug. 8.5	16.87	9	78.1	29	21.91	9	32.5	32	31.73	11	24.7	17	62.72	9	54.2	32
18.5	16.91	4	80.8	27	21.94	3	35.5	30	31.79	6	26.1	14	62.75	3	57.3	31
28.4	16.90	1	83.3	25	21.93	1	38.3	28	31.81	2	27.3	12	62.74	1	60.2	29
Sept. 7.4	16.85	5	85.5	22	21.87	6	40.8	25	31.79	2	28.3	10	62.68	6	62.8	26
17.4	16.76	9	87.4	19	21.76	11	43.1	23	31.73	6	29.1	8	62.57	11	65.1	23
27.4	16.64	12	89.0	16	21.62	14	45.1	20	31.64	9	29.7	6	62.42	15	67.1	20
Oct. 7.3	16.49	15	90.3	13	21.45	17	46.7	16	31.53	11	30.1	4	62.25	17	68.7	16
17.3	16.32	17	91.2	9	21.26	19	47.8	11	31.40	13	30.2	1	62.05	20	69.9	12
27.3	16.14	18	91.7	5	21.05	21	48.5	7	31.26	14	30.1	1	61.84	21	70.7	8
Nov. 6.3	15.96	18	91.8	1	20.84	21	48.8	3	31.12	14	29.8	3	61.63	21	71.0	3
16.2	15.78	18	91.5	3	20.64	20	48.6	2	30.99	13	29.3	5	61.42	21	70.9	1
26.2	15.62	16	90.8	7	20.45	19	48.0	6	30.87	12	28.7	6	61.22	20	70.3	6
Dec. 6.2	15.48	14	89.7	11	20.28	17	46.9	11	30.77	10	27.9	8	61.04	18	69.2	11
16.1	15.36	12	88.3	14	20.13	15	45.4	15	30.70	7	27.0	9	60.89	15	67.7	15
26.1	15.27	9	86.5	18	20.02	11	43.5	19	30.65	5	26.0	10	60.77	12	65.8	19
36.1	15.22	5	84.5	20	19.94	8	41.3	22	30.63	2	24.9	11	60.68	9	63.6	22
Sec δ, Tan δ	1.153		+0.574		1.263		+0.772		1.004		+0.085		1.287		+0.811	
Mean Place	13ˢ.967		70″.32		19ˢ.060		24″.93		28ˢ.509		15″.46		59ˢ.882		47″.04	
D′ψ α, Dω α	−0.01		−0.03		−0.01		−0.04		0.00		0.00		−0.01		−0.04	
Dψ δ, Dω δ	+0.3		−0.7		+0.3		−0.7		+0.3		−0.7		+0.3		−0.7	

Mean Solar Date.	θ¹ Microscopii. Mag. 4.9				α Cephei. Mag. 2.6				ι Capricorni. Mag. 4.3				1 Pegasi. Mag. 4.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	21 15		−41 10		21 16		+62 12		21 17		−17 12		21 18		+19 25	
	s		″		s		″		s		″		s		″	
Jan. 1.1	10.75	0	56.1	14	27.16	21	64.7	26	23.20	0	31.5	0	2.41	2	51.3	18
11.1	10.75	4	54.7	15	26.95	14	62.1	30	23.20	4	31.5	1	2.39	1	49.5	18
21.1	10.79	8	53.2	17	26.81	6	59.1	32	23.24	7	31.4	3	2.40	4	47.7	18
31.0	10.87	12	51.5	18	26.75	2	55.9	32	23.31	10	31.1	4	2.44	8	45.9	17
Feb. 10.0	10.99	17	49.7	20	26.77	10	52.7	31	23.41	13	30.7	6	2.52	11	44.2	16
20.0	11.16	21	47.7	21	26.87	19	49.6	29	23.54	17	30.1	7	2.63	15	42.6	14
Mar. 1.9	11.37	24	45.6	21	27.06	27	46.7	26	23.71	20	29.4	9	2.78	18	41.2	11
11.9	11.61	28	43.5	21	27.33	34	44.1	22	23.91	22	28.5	11	2.96	21	40.1	7
21.9	11.89	31	41.4	20	27.67	40	41.9	17	24.13	25	27.4	12	3.17	24	39.4	3
31.9	12.20	34	39.4	20	28.07	45	40.2	12	24.38	27	26.2	13	3.41	27	39.1	1
Apr. 10.8	12.54	36	37.4	19	28.52	49	39.0	5	24.65	30	24.9	15	3.68	29	39.2	6
20.8	12.90	39	35.5	17	29.01	52	38.5	1	24.95	32	23.4	16	3.97	31	39.8	10
30.8	13.29	40	33.8	15	29.53	53	38.6	7	25.27	33	21.8	16	4.28	32	40.8	14
May 10.8	13.69	41	32.3	13	30.06	53	39.3	13	25.60	33	20.2	16	4.60	32	42.2	17
20.7	14.10	40	31.0	10	30.59	51	40.6	19	25.93	33	18.6	16	4.92	32	43.9	20
30.7	14.50	39	30.0	8	31.10	47	42.5	23	26.26	33	17.0	15	5.24	31	45.9	23
June 9.7	14.89	37	29.2	5	31.57	43	44.8	28	26.59	31	15.5	14	5.55	29	48.2	24
19.6	15.26	34	28.7	1	32.00	37	47.6	31	26.90	28	14.1	12	5.84	26	50.6	25
29.6	15.60	31	28.6	2	32.37	30	50.7	34	27.18	25	12.9	10	6.10	23	53.1	26
July 9.6	15.91	26	28.8	5	32.67	23	54.1	36	27.43	22	11.9	8	6.33	19	55.7	26
19.6	16.17	21	29.3	7	32.90	16	57.7	37	27.65	17	11.1	6	6.52	15	58.3	26
29.5	16.38	15	30.0	10	33.06	7	61.4	37	27.82	13	10.5	4	6.67	11	60.9	24
Aug. 8.5	16.53	10	31.0	12	33.13	1	65.1	36	27.95	8	10.1	2	6.78	6	63.3	22
18.5	16.63	4	32.2	14	33.12	9	68.7	35	28.03	4	9.9	0	6.84	2	65.5	20
28.5	16.67	2	33.6	14	33.03	16	72.2	33	28.07	1	9.9	2	6.86	3	67.5	18
Sept. 7.4	16.65	8	35.0	15	32.87	23	75.5	30	28.06	5	10.1	4	6.83	6	69.3	16
17.4	16.57	12	36.5	14	32.64	29	78.5	27	28.01	9	10.5	4	6.77	10	70.9	12
27.4	16.45	15	37.9	13	32.35	34	81.2	23	27.92	11	10.9	5	6.67	12	72.1	9
Oct. 7.3	16.30	18	39.2	11	32.01	38	83.5	18	27.81	13	11.4	6	6.55	14	73.0	6
17.3	16.12	19	40.3	8	31.63	41	85.3	14	27.68	14	12.0	5	6.41	15	73.6	3
27.3	15.93	20	41.1	6	31.22	42	86.7	8	27.54	14	12.5	5	6.26	16	73.9	0
Nov. 6.3	15.73	19	41.7	3	30.80	42	87.5	2	27.40	13	13.0	5	6.10	15	73.9	3
16.2	15.54	17	42.0	0	30.38	41	87.7	3	27.27	12	13.5	4	5.95	14	73.6	6
26.2	15.37	14	42.0	4	29.97	39	87.4	9	27.15	10	13.9	3	5.81	12	73.0	10
Dec. 6.2	15.23	11	41.6	7	29.58	35	86.5	14	27.05	7	14.2	2	5.69	9	72.0	12
16.2	15.12	7	40.9	9	29.23	30	85.1	20	26.98	5	14.4	1	5.60	7	70.8	14
26.1	15.05	4	40.0	12	28.93	25	83.1	24	26.93	2	14.5	0	5.53	4	69.4	17
36.1	15.01		38.8		28.68		80.7		26.91		14.5		5.49		67.7	
Sec δ, Tan δ	1.329		−0.875		2.145		+1.898		1.047		−0.310		1.060		+0.353	
Mean Place	$11^{s}.909$		40″.42		$30^{s}.283$		60″.09		$24^{s}.275$		20″.19		$3^{s}.768$		54″.44	
$D'_{\psi}\,a$, $D_{\omega}\,a$	+0.02		+0.04		−0.03		−0.10		+0.01		+0.02		−0.01		−0.02	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	+0.3		−0.7		+0.3		−0.7		+0.3		−0.7		+0.3		−0.6	

Mean Solar Date.	γ Pavonis. Mag. 4.3				ζ Capricorni. Mag. 3.9				g Cygni. Mag. 5.3				β Aquarii. Mag. 3.1			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	21 19		−65 45		21 21		−22 47		21 26		+46 9		21 26		− 5 57	
	s		″		s		″		s		″		s		″	
Jan. 1.1	14.12		57.2		41.12		31.8		12.28		26.8		57.72		24.8	
11.1	14.03	9	54.7	25	41.12	0	31.5	3	12.18	10	24.4	24	57.72	0	25.3	5
21.1	14.03	0	51.9	28	41.16	4	31.0	5	12.12	6	21.7	27	57.74	2	25.8	5
31.0	14.11	8	48.9	30	41.23	7	30.4	6	12.11	1	18.9	28	57.80	6	26.2	4
Feb. 10.0	14.28	17	45.8	31	41.33	10	29.6	8	12.15	4	16.1	28	57.89	9	26.5	3
20.0	14.53	25	42.6	32	41.46	13	28.7	9	12.25	10	13.3	28	58.00	11	26.6	1
Mar. 1.9	14.85	32	39.5	31	41.62	16	27.6	11	12.39	14	10.8	25	58.14	14	26.5	1
11.9	15.24	39	36.5	30	41.82	20	26.4	12	12.58	19	8.6	22	58.32	18	26.2	3
21.9	15.69	45	33.6	29	42.05	23	25.1	13	12.82	24	6.8	18	58.53	21	25.7	5
31.9	16.21	52	30.9	27	42.31	26	23.6	15	13.11	29	5.4	14	58.76	23	24.9	8
Apr. 10.8	16.78	57	28.5	24	42.59	28	22.0	16	13.44	33	4.6	8	59.02	26	23.9	10
20.8	17.39	61	26.4	21	42.89	30	20.4	16	13.79	35	4.4	2	59.30	28	22.6	13
30.8	18.03	64	24.7	17	43.21	32	18.7	17	14.17	38	4.7	3	59.60	30	21.2	14
May 10.8	18.69	66	23.3	14	43.55	34	17.1	16	14.56	39	5.6	9	59.91	31	19.6	16
20.7	19.36	67	22.3	10	43.90	35	15.5	16	14.95	39	7.0	14	60.23	32	17.9	17
30.7	20.03	67	21.8	5	44.24	34	14.0	15	15.34	39	9.0	20	60.55	32	16.1	18
June 9.7	20.67	64	21.8	0	44.57	33	12.6	14	15.71	37	11.4	24	60.86	31	14.3	18
19.6	21.28	61	22.2	4	44.89	32	11.4	12	16.05	34	14.1	27	61.16	30	12.5	18
29.6	21.84	56	23.0	8	45.19	30	10.4	10	16.36	31	17.1	30	61.44	28	10.8	17
July 9.6	22.33	49	24.2	12	45.45	26	9.6	8	16.62	26	20.3	32	61.69	25	9.2	16
19.6	22.75	42	25.8	16	45.68	23	9.1	5	16.84	22	23.7	34	61.90	21	7.8	14
29.5	23.08	33	27.7	19	45.86	18	8.8	3	17.00	16	27.2	35	62.07	17	6.5	13
Aug. 8.5	23.31	23	29.8	21	46.00	14	8.7	1	17.10	10	30.6	34	62.20	13	5.4	11
18.5	23.44	13	32.1	23	46.09	9	8.9	2	17.14	4	33.9	33	62.29	9	4.5	9
28.5	23.47	3	34.5	24	46.13	4	9.3	4	17.13	1	37.0	31	62.33	4	3.9	6
Sept. 7.4	23.39	8	36.9	24	46.13	0	9.8	5	17.07	6	40.0	30	62.33	0	3.5	4
17.4	23.22	17	39.2	23	46.08	5	10.4	6	16.95	12	42.7	27	62.29	4	3.2	3
27.4	22.97	25	41.3	21	45.99	9	11.1	7	16.79	16	45.0	23	62.21	8	3.1	1
Oct. 7.3	22.65	32	43.1	18	45.88	11	11.8	7	16.60	19	47.0	20	62.11	10	3.2	1
17.3	22.27	38	44.5	14	45.75	13	12.5	7	16.38	22	48.5	15	61.99	12	3.4	2
27.3	21.86	41	45.5	10	45.60	15	13.2	7	16.14	24	49.6	11	61.86	13	3.7	3
Nov. 6.3	21.44	42	46.0	5	45.45	15	13.8	6	15.89	25	50.2	6	61.73	13	4.1	4
16.2	21.02	42	46.0	0	45.31	14	14.2	4	15.65	24	50.3	1	61.60	13	4.6	5
26.2	20.63	39	45.4	6	45.18	13	14.5	3	15.41	24	49.9	4	61.48	12	5.1	5
Dec. 6.2	20.28	35	44.3	11	45.08	10	14.7	2	15.19	22	49.0	9	61.38	10	5.7	6
16.2	19.99	29	42.8	15	45.00	8	14.8	1	15.00	19	47.6	14	61.31	7	6.3	6
26.1	19.77	22	40.8	20	44.95	5	14.7	1	14.84	16	45.8	18	61.26	5	6.9	6
36.1	19.63	14	38.4	24	44.93	2	14.4	3	14.71	13	43.5	23	61.23	3	7.5	6
Sec δ, Tan δ	2.436		−2.221		1.085		−0.420		1.443		+1.041		1.005		−0.104	
Mean Place	15ˢ.867		38″.69		42ˢ.171		19″.31		14ˢ.290		23″.89		58ˢ.803		16″.06	
D′ψ α, Dω α	+0.04		+0.11		+0.01		+0.02		−0.02		−0.05		0.00		+0.01	
Dψ δ, Dω δ	+0.3		−0.6		+0.3		−0.6		+0.3		−0.6		+0.3		−0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**β Cephei.** Mag. 3.3				**ξ Aquarii.** Mag. 4.8				**74 Cygni.** Mag. 5.1				**γ Capricorni.** Mag. 3.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 21 27		° ′ +70 10		h m 21 33		° ′ − 8 14		h m 21 33		° ′ +40 1		h m 21 35		° ′ −17 3	
	s		″		s		″		s		″		s		″	
Jan. 1.1	28.34		49.6		6.27		50.6		25.93		22.3		15.38		31.7	
11.1	27.98	36	47.1	25	6.26	1	51.1	5	25.84	9	20.1	22	15.37	1	31.7	0
21.1	27.71	27	44.2	29	6.28	2	51.5	4	25.79	5	17.6	25	15.39	2	31.6	1
31.0	27.55	16	41.1	31	6.33	5	51.7	2	25.79	0	15.0	26	15.44	5	31.3	3
Feb. 10.0	27.51	4	37.9	32	6.41	8	51.8	1	25.83	4	12.4	26	15.52	8	30.9	4
20.0	27.59	8	34.7	32	6.52	11	51.7	1	25.92	9	9.9	25	15.63	11	30.3	6
Mar. 2.0	27.78	19	31.6	31	6.66	14	51.5	2	26.05	13	7.6	23	15.78	15	29.5	8
11.9	28.09	31	28.8	28	6.83	17	51.1	4	26.22	17	5.6	20	15.96	18	28.5	10
21.9	28.50	41	26.3	25	7.03	20	50.4	7	26.44	22	3.9	17	16.17	21	27.4	11
31.9	29.00	50	24.3	20	7.26	23	49.5	9	26.70	26	2.7	12	16.40	23	26.1	13
Apr. 10.8	29.58	58	22.9	14	7.52	26	48.4	11	27.00	30	2.0	7	16.66	26	24.7	14
20.8	30.22	64	22.1	8	7.80	28	47.1	13	27.33	33	1.9	1	16.95	29	23.1	16
30.8	30.89	67	21.9	2	8.10	30	45.6	15	27.68	35	2.3	4	17.26	31	21.4	17
May 10.8	31.58	69	22.3	4	8.42	32	43.9	17	28.04	36	3.3	10	17.59	33	19.7	17
20.7	32.27	69	23.4	11	8.74	32	42.2	17	28.41	37	4.8	15	17.92	33	18.0	17
30.7	32.93	66	25.0	16	9.06	32	40.4	18	28.77	36	6.7	19	18.25	33	16.3	17
June 9.7	33.55	62	27.1	21	9.38	32	38.6	18	29.12	35	9.0	23	18.58	33	14.7	16
19.7	34.11	56	29.7	26	9.68	30	36.9	17	29.45	33	11.7	27	18.90	32	13.2	15
29.6	34.60	49	32.7	30	9.96	28	35.2	17	29.75	30	14.6	29	19.19	29	11.9	13
July 9.6	35.00	40	36.0	33	10.22	26	33.7	15	30.01	26	17.7	31	19.46	27	10.8	11
19.6	35.30	30	39.5	35	10.44	22	32.4	13	30.23	22	20.9	32	19.69	23	9.9	9
29.5	35.49	19	43.2	37	10.62	18	31.2	12	30.40	17	24.2	33	19.88	19	9.2	7
Aug. 8.5	35.58	9	47.0	38	10.75	13	30.2	10	30.51	11	27.5	33	20.02	14	8.8	4
18.5	35.57	1	50.7	37	10.84	9	29.5	7	30.57	6	30.6	31	20.12	10	8.6	2
28.5	35.45	12	54.4	37	10.89	5	29.0	5	30.58	1	33.6	30	20.17	5	8.6	0
Sept. 7.4	35.22	23	57.9	35	10.89	0	28.7	3	30.54	4	36.4	28	20.18	1	8.8	2
17.4	34.90	32	61.2	33	10.86	3	28.6	1	30.45	9	38.9	25	20.15	3	9.2	4
27.4	34.50	40	64.1	29	10.79	7	28.6	0	30.32	13	41.0	21	20.08	7	9.6	4
Oct. 7.4	34.03	47	66.7	26	10.70	9	28.8	2	30.16	16	42.8	18	19.98	10	10.1	5
17.3	33.50	53	68.8	21	10.58	12	29.1	3	29.98	18	44.2	14	19.86	12	10.7	6
27.3	32.93	57	70.5	17	10.45	13	29.5	4	29.78	20	45.2	10	19.73	13	11.3	6
Nov. 6.3	32.33	60	71.6	11	10.32	13	29.9	4	29.57	21	45.7	5	19.59	14	11.9	6
16.2	31.71	62	72.2	6	10.19	13	30.4	5	29.36	21	45.8	1	19.46	13	12.4	5
26.2	31.10	61	72.2	0	10.07	12	30.9	5	29.16	20	45.4	4	19.34	12	12.9	5
Dec. 6.2	30.52	58	71.6	6	9.97	10	31.4	5	28.97	19	44.6	8	19.23	11	13.3	4
16.2	29.98	54	70.4	12	9.89	8	31.9	5	28.81	16	43.3	13	19.15	8	13.5	2
26.1	29.49	49	68.6	18	9.84	5	32.4	5	28.67	14	41.6	17	19.09	6	13.6	1
36.1	29.08	41	66.3	23	9.81	3	32.9	5	28.56	11	39.5	21	19.06	3	13.7	1
Sec δ, Tan δ	2.949		+2.774		1.010		−0.145		1.306		+0.840		1.046		−0.307	
Mean Place	32ˢ.588		43″.11		7ˢ.307		41″.49		27ˢ.678		20″.11		16ˢ.367		20″.57	
D′ψ α, Dω α	−0.05		−0.15		0.00		+0.01		−0.01		−0.04		0.00		+0.02	
Dψ δ, Dω δ	+0.3		−0.6		+0.3		−0.6		+0.3		−0.6		+0.3		−0.6	

Mean Solar Date.	**λ Octantis.** Mag. 5.4				**ε Pegasi.** Mag. 2.5				**11 Cephei.** Mag. 4.8				**δ Capricorni.** Mag. 3.0			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 21 37		° ′ −83 6		h m 21 39		° ′ + 9 28		h m 21 40		° ′ +70 54		h m 21 42		° ′ −16 31	
	s		″		s		″		s		″		s		″	
Jan. 1.1	36.81		92.1		53.62		27.7		34.76		46.1		13.48		32.2	
11.1	36.10	71	89.1	30	53.59	3	26.5	12	34.35	41	43.7	24	13.47	1	32.2	0
21.1	35.68	42	85.7	34	53.59	0	25.2	13	34.04	31	40.9	28	13.48	1	32.1	1
31.0	35.57	11	82.1	36	53.62	3	24.0	12	33.84	20	37.9	30	13.52	4	31.9	2
Feb. 10.0	35.77	20	78.4	37	53.68	6	22.8	12	33.76	8	34.7	32	13.59	7	31.5	4
20.0	36.26	49	74.7	37	53.78	10	21.8	10	33.80	4	31.5	32	13.70	11	30.9	6
Mar. 2.0	37.03	77	71.1	36	53.91	13	21.0	8	33.96	16	28.4	31	13.84	14	30.1	8
11.9	38.07	104	67.6	35	54.07	16	20.4	6	34.24	28	25.5	29	14.01	17	29.2	9
21.9	39.34	127	64.3	33	54.26	19	20.2	2	34.63	39	22.9	26	14.21	20	28.1	11
31.9	40.83	149	61.3	30	54.48	22	20.3	1	35.12	49	20.8	21	14.44	23	26.8	13
Apr. 10.9	42.50	167	58.6	27	54.73	25	20.8	5	35.70	58	19.3	15	14.70	26	25.4	14
20.8	44.32	182	56.3	23	55.00	27	21.6	8	36.34	64	18.3	10	14.98	28	23.8	16
30.8	46.25	193	54.5	18	55.29	29	22.7	11	37.03	69	17.9	4	15.29	31	22.1	17
May 10.8	48.25	200	53.1	14	55.60	31	24.1	14	37.74	71	18.2	3	15.61	32	20.4	17
20.7	50.29	204	52.2	9	55.92	32	25.8	17	38.46	72	19.1	9	15.94	33	18.6	18
30.7	52.32	203	51.8	4	56.24	32	27.8	20	39.16	70	20.5	14	16.27	33	16.9	17
June 9.7	54.29	197	52.0	2	56.55	31	29.9	21	39.82	66	22.5	20	16.60	33	15.3	16
19.7	56.16	187	52.7	7	56.85	30	32.1	22	40.42	60	25.0	25	16.92	32	13.8	15
29.6	57.88	172	53.9	12	57.13	28	34.4	23	40.95	53	27.9	29	17.22	30	12.4	14
July 9.6	59.40	152	55.5	16	57.38	25	36.6	22	41.39	44	31.1	32	17.49	27	11.2	12
19.6	60.69	129	57.5	20	57.59	21	38.8	22	41.74	35	34.6	35	17.73	24	10.2	10
29.6	61.70	101	59.9	24	57.76	17	40.9	21	41.98	24	38.3	37	17.92	19	9.5	7
Aug. 8.5	62.41	71	62.6	27	57.89	13	42.9	20	42.11	13	42.0	37	18.07	15	9.0	5
18.5	62.80	39	65.4	28	57.98	9	44.7	18	42.13	2	45.8	38	18.18	11	8.8	2
28.5	62.85	5	68.3	29	58.03	5	46.2	15	42.04	9	49.5	37	18.24	6	8.8	0
Sept. 7.4	62.57	28	71.1	28	58.03	0	47.5	13	41.85	19	53.1	36	18.26	2	9.0	2
17.4	61.97	60	73.8	27	58.00	3	48.6	11	41.56	29	56.5	34	18.23	3	9.3	3
27.4	61.06	91	76.3	25	57.93	7	49.4	8	41.18	38	59.6	31	18.16	7	9.7	4
Oct. 7.4	59.89	117	78.5	22	57.83	10	50.0	6	40.72	46	62.3	27	18.07	9	10.3	6
17.3	58.50	139	80.2	17	57.71	12	50.4	4	40.20	52	64.6	23	17.96	11	10.9	6
27.3	56.95	155	81.3	11	57.58	13	50.5	1	39.62	58	66.5	19	17.83	13	11.5	6
Nov. 6.3	55.31	164	81.8	5	57.45	13	50.4	1	39.01	61	67.8	13	17.69	14	12.1	6
16.2	53.64	167	81.8	0	57.32	13	50.1	3	38.38	63	68.6	8	17.56	13	12.6	5
26.2	52.01	163	81.2	6	57.19	13	49.5	6	37.75	63	68.8	2	17.44	12	13.1	5
Dec. 6.2	50.49	152	79.9	13	57.08	11	48.7	8	37.14	61	68.4	4	17.33	11	13.5	4
16.2	49.13	136	78.0	19	56.99	9	47.8	9	36.57	57	67.4	10	17.24	9	13.8	3
26.1	47.98	115	75.6	24	56.92	7	46.8	10	36.05	52	65.8	16	17.18	6	14.0	2
36.1	47.08	90	72.8	28	56.88	4	45.6	12	35.60	45	63.7	21	17.15	3	14.1	1
Sec δ, Tan δ	8.348		−8.287		1.014		+0.167		3.058		+2.890		1.043		−0.297	
Mean Place	41ˢ.405		72″.22		54ˢ.768		32″.30		39ˢ.063		38″.31		14ˢ.441		21″.23	
$D'_\psi \alpha$, $D_\omega \alpha$	+0.13		+0.45		0.00		−0.01		−0.04		−0.16		0.00		+0.02	
$D_\psi \delta$, $D_\omega \delta$	+0.3		−0.6		+0.3		−0.6		+0.3		−0.6		+0.3		−0.6	

Mean Solar Date.	**x^2 Cygni.** Mag. 4.3				**μ Capricorni.** Mag. 5.2				**γ Gruis.** Mag. 3.2				**16 Pegasi.** Mag. 5.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	21 43		+48 54		21 48		−13 57		21 48		−37 46		21 49		+25 30	
	s		″		s		″		s		″		s		″	
Jan. 1.1	32.63	14	28.7	23	32.31	2	53.1	1	38.93	4	44.1	11	4.83	6	55.6	18
11.1	32.49	9	26.4	26	32.29	0	53.2	0	38.89	0	43.0	13	4.77	3	53.8	19
21.1	32.40	4	23.8	28	32.29	4	53.2	1	38.89	4	41.7	15	4.74	1	51.9	20
31.0	32.36	1	21.0	28	32.33	7	53.1	3	38.93	8	40.2	17	4.75	4	49.9	19
Feb. 10.0	32.37	7	18.2	28	32.40	10	52.8	4	39.01	12	38.5	19	4.79	7	48.0	19
20.0	32.44	12	15.4	27	32.50	13	52.4	6	39.13	15	36.6	20	4.86	11	46.1	17
Mar. 2.0	32.56	18	12.7	24	32.63	16	51.8	8	39.28	19	34.6	21	4.97	15	44.4	14
11.9	32.74	23	10.3	20	32.79	19	51.0	10	39.47	23	32.5	22	5.12	19	43.0	10
21.9	32.97	28	8.3	15	32.98	22	50.0	12	39.70	26	30.3	22	5.31	23	42.0	6
31.9	33.25	32	6.8	10	33.20	25	48.8	14	39.96	30	28.1	22	5.54	26	41.4	2
Apr. 10.9	33.57	36	5.8	5	33.45	28	47.4	15	40.26	33	25.9	21	5.80	28	41.2	2
20.8	33.93	39	5.3	1	33.73	30	45.9	17	40.59	35	23.8	20	6.08	31	41.4	7
30.8	34.32	40	5.4	7	34.03	32	44.2	17	40.94	37	21.8	19	6.39	32	42.1	11
May 10.8	34.72	41	6.1	13	34.35	32	42.5	18	41.31	38	19.9	17	6.71	33	43.2	15
20.7	35.13	41	7.4	17	34.67	33	40.7	18	41.69	39	18.2	14	7.04	33	44.7	19
30.7	35.54	40	9.1	22	35.00	33	38.9	18	42.08	39	16.8	12	7.37	33	46.6	22
June 9.7	35.94	37	11.3	26	35.33	32	37.1	16	42.47	38	15.6	9	7.70	31	48.8	25
19.7	36.31	33	13.9	29	35.65	30	35.5	15	42.85	35	14.7	6	8.01	29	51.3	27
29.6	36.64	29	16.8	32	35.95	27	34.0	13	43.20	32	14.1	3	8.30	26	54.0	27
July 9.6	36.93	24	20.0	34	36.22	23	32.7	11	43.52	28	13.8	1	8.56	22	56.7	28
19.6	37.17	18	23.4	35	36.45	20	31.6	9	43.80	23	13.9	4	8.78	18	59.5	28
29.6	37.35	13	26.9	35	36.65	16	30.7	7	44.03	19	14.3	7	8.96	14	62.3	27
Aug. 8.5	37.48	7	30.4	34	36.81	11	30.0	4	44.22	13	15.0	10	9.10	9	65.0	26
18.5	37.55	1	33.8	33	36.92	6	29.6	2	44.35	7	16.0	12	9.19	4	67.6	24
28.5	37.56	5	37.1	31	36.98	2	29.4	0	44.42	2	17.2	13	9.23	0	70.0	22
Sept. 7.4	37.51	10	40.2	29	37.00	2	29.4	2	44.44	3	18.5	14	9.23	4	72.2	19
17.4	37.41	15	43.1	26	36.98	5	29.6	3	44.41	8	19.9	14	9.19	8	74.1	17
27.4	37.26	18	45.7	22	36.93	9	29.9	4	44.33	12	21.3	14	9.11	10	75.8	13
Oct. 7.4	37.08	22	47.9	18	36.84	11	30.3	5	44.21	14	22.7	13	9.01	13	77.1	10
17.3	36.86	24	49.7	13	36.73	12	30.8	6	44.07	17	24.0	11	8.88	15	78.1	7
27.3	36.62	26	51.0	8	36.61	13	31.4	6	43.90	18	25.1	8	8.73	16	78.8	3
Nov. 6.3	36.36	26	51.8	4	36.48	13	32.0	5	43.72	17	25.9	6	8.57	15	79.1	1
16.3	36.10	25	52.2	1	36.35	12	32.5	5	43.55	17	26.5	3	8.42	15	79.0	4
26.2	35.85	24	52.1	7	36.23	11	33.0	5	43.38	15	26.8	0	8.27	14	78.6	7
Dec. 6.2	35.61	22	51.4	12	36.12	9	33.5	4	43.23	12	26.8	4	8.13	12	77.9	11
16.2	35.39	19	50.2	17	36.03	6	33.9	3	43.11	9	26.4	6	8.01	10	76.8	14
26.1	35.20	16	48.5	21	35.97	4	34.2	2	43.02	6	25.8	9	7.91	7	75.4	16
36.1	35.04		46.4		35.93		34.4		42.96		24.9		7.84		73.8	
Sec δ, Tan δ	1.522		+1.147		1.030		−0.249		1.265		−0.775		1.108		+0.477	
Mean Place	34ˢ.681		24″.03		33ˢ.249		42″.80		39ˢ.850		28″.49		6ˢ.168		55″.71	
D′ψ α, Dω α	−0.02		−0.06		0.00		+0.01		+0.01		+0.04		−0.01		−0.03	
Dψ δ, Dω δ	+0.3		−0.6		+0.3		−0.5		+0.3		−0.5		+0.3		−0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	79 Draconis. Mag. 6.6				ε Indi. Mag. 4.7				20 Pegasi. Mag. 5.7				α Aquarii. Mag. 3.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	21 51		+73 17		21 56		−57 8		21 56		+12 41		22 1		− 0 44	
	s		″		s		″		s		″		s		″	
Jan. 1.1	41.58		34.9		41.65		56.9		49.91		66.8		18.00		40.8	
11.1	41.08	50	32.7	22	41.56	9	55.1	18	49.87	4	65.5	13	17.97	3	41.6	8
21.1	40.68	40	30.1	26	41.52	4	52.9	22	49.86	1	64.2	13	17.96	1	42.3	7
31.1	40.40	28	27.1	30	41.54	2	50.4	25	49.87	1	62.8	14	17.98	2	42.9	6
Feb. 10.0	40.26	14	23.9	32	41.62	8	47.7	27	49.91	4	61.5	13	18.03	5	43.4	5
20.0	40.26	0	20.7	32	41.76	14	44.9	28	49.98	7	60.3	12	18.11	8	43.8	4
Mar. 2.0	40.40	14	17.6	31	41.95	19	42.0	29	50.09	11	59.3	10	18.22	11	44.0	2
11.9	40.67	27	14.6	30	42.20	25	39.1	29	50.23	14	58.6	7	18.36	14	43.9	1
21.9	41.07	40	12.0	26	42.51	31	36.2	29	50.41	18	58.2	4	18.53	17	43.6	3
31.9	41.59	52	9.8	22	42.87	36	33.4	28	50.62	21	58.1	1	18.73	20	43.0	6
Apr. 10.9	42.22	63	8.1	17	43.28	41	30.8	26	50.86	24	58.4	3	18.97	24	42.1	9
20.8	42.93	71	6.9	12	43.73	45	28.4	24	51.12	26	59.1	7	19.23	26	41.0	11
30.8	43.69	76	6.3	6	44.21	48	26.2	22	51.41	29	60.1	10	19.51	28	39.6	14
May 10.8	44.48	79	6.4	1	44.72	51	24.4	18	51.72	31	61.5	14	19.81	30	38.0	16
20.8	45.28	80	7.1	7	45.25	53	22.9	15	52.04	32	63.2	17	20.13	32	36.2	18
30.7	46.07	79	8.4	13	45.79	54	21.8	11	52.36	32	65.1	19	20.45	32	34.3	19
June 9.7	46.82	75	10.2	18	46.32	53	21.1	7	52.68	32	67.2	21	20.77	32	32.3	20
19.7	47.51	69	12.5	23	46.84	52	20.8	3	52.99	31	69.5	23	21.08	31	30.3	20
29.6	48.12	61	15.3	28	47.33	49	20.9	1	53.27	28	71.8	23	21.37	29	28.3	20
July 9.6	48.64	52	18.4	31	47.78	45	21.5	6	53.53	26	74.2	24	21.64	27	26.4	19
19.6	49.05	41	21.8	34	48.17	39	22.5	10	53.76	23	76.5	23	21.87	23	24.6	18
29.6	49.35	30	25.4	36	48.50	33	23.9	14	53.95	19	78.7	22	22.07	20	23.0	16
Aug. 8.5	49.53	18	29.1	37	48.76	26	25.6	17	54.10	15	80.8	21	22.23	16	21.6	14
18.5	49.58	5	32.9	38	48.95	19	27.6	20	54.20	10	82.8	20	22.34	11	20.4	12
28.5	49.51	7	36.7	38	49.06	11	29.8	22	54.26	6	84.6	18	22.41	7	19.4	10
Sept. 7.5	49.32	19	40.4	37	49.09	3	32.0	22	54.28	2	86.1	15	22.44	3	18.6	8
17.4	49.01	31	43.9	35	49.05	4	34.3	23	54.26	2	87.4	13	22.43	1	18.0	6
27.4	48.60	41	47.1	32	48.94	11	36.5	22	54.20	6	88.5	11	22.38	5	17.6	4
Oct. 7.4	48.10	50	50.0	29	48.76	18	38.5	20	54.11	9	89.3	8	22.31	7	17.5	1
17.3	47.53	57	52.5	25	48.54	22	40.3	18	54.00	11	89.8	5	22.21	10	17.5	0
27.3	46.89	64	54.5	20	48.28	26	41.8	15	53.88	12	90.1	3	22.09	12	17.7	2
Nov. 6.3	46.20	69	56.1	16	48.00	28	42.9	11	53.75	13	90.1	0	21.97	12	18.0	3
16.3	45.49	71	57.1	10	47.72	28	43.5	6	53.62	13	89.9	2	21.85	12	18.4	4
26.2	44.77	72	57.5	4	47.45	27	43.7	2	53.49	13	89.4	5	21.73	12	18.9	5
Dec. 6.2	44.06	71	57.3	2	47.20	25	43.4	3	53.38	11	88.7	7	21.62	11	19.5	6
16.2	43.38	68	56.5	8	46.98	22	42.6	8	53.28	10	87.8	9	21.53	9	20.2	7
26.2	42.75	63	55.1	14	46.80	18	41.3	13	53.20	8	86.7	11	21.46	7	20.9	7
36.1	42.19	56	53.1	20	46.67	13	39.6	17	53.14	6	85.5	12	21.41	5	21.7	8
Sec δ, Tan δ	3.478		+3.331		1.843		−1.549		1.025		+0.225		1.000		−0.013	
Mean Place	46ˢ.372		25″.97		42ˢ.665		38″.19		51ˢ.027		69″.86		18ˢ.967		34″.29	
D′ψ α, Dω α	−0.05		−0.19		+0.02		+0.09		0.00		−0.01		0.00		0.00	
Dψ δ, Dω δ	+0.3		−0.5		+0.3		−0.5		+0.3		−0.5		+0.3		−0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ι Aquarii. Mag. 4.4				20 Cephei. Mag. 5.4				α Gruis. Mag. 2.2				ι Pegasi. Mag. 4.0			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	22 1		−14 17		22 2		+62 21		22 2		−47 22		22 2		+24 54	
	s		″		s		″		s		″		s		″	
Jan. 1.1	43.52	3	42.1	1	18.96	27	47.6	21	44.44	7	76.1	15	56.34	6	71.7	17
11.1	43.49	0	42.2	0	18.69	21	45.5	26	44.37	3	74.6	18	56.28	4	70.0	18
21.1	43.49	2	42.2	1	18.48	14	42.9	29	44.34	1	72.8	20	56.24	1	68.2	19
31.1	43.51	5	42.1	3	18.34	7	40.0	30	44.35	6	70.8	23	56.23	3	66.3	19
Feb. 10.0	43.56	8	41.8	5	18.27	1	37.0	31	44.41	10	68.5	24	56.26	6	64.4	18
20.0	43.64	12	41.3	7	18.28	9	33.9	30	44.51	15	66.1	25	56.32	10	62.6	16
Mar. 2.0	43.76	15	40.6	9	18.37	18	30.9	28	44.66	19	63.6	26	56.42	14	61.0	14
11.9	43.91	18	39.7	11	18.55	26	28.1	25	44.85	24	61.0	27	56.56	17	59.6	11
21.9	44.09	21	38.6	12	18.81	34	25.6	21	45.09	28	58.3	26	56.73	21	58.5	7
31.9	44.30	24	37.4	14	19.15	40	23.5	16	45.37	32	55.7	25	56.94	24	57.8	2
Apr. 10.9	44.54	27	36.0	16	19.55	46	21.9	10	45.69	36	53.2	24	57.18	28	57.6	2
20.8	44.81	29	34.4	17	20.01	50	20.9	4	46.05	39	50.8	23	57.46	30	57.8	6
30.8	45.10	31	32.7	18	20.51	52	20.5	2	46.44	41	48.5	20	57.76	32	58.4	11
May 10.8	45.41	33	30.9	19	21.03	54	20.7	8	46.85	43	46.5	17	58.08	33	59.5	15
20.8	45.74	33	29.0	18	21.57	54	21.5	13	47.28	44	44.8	14	58.41	34	61.0	19
30.7	46.07	33	27.2	18	22.11	52	22.8	19	47.72	44	43.4	11	58.75	33	62.9	21
June 9.7	46.40	32	25.4	17	22.63	49	24.7	24	48.16	42	42.3	8	59.08	32	65.0	24
19.7	46.72	30	23.7	15	23.12	44	27.1	28	48.58	40	41.5	3	59.40	30	67.4	26
29.6	47.02	28	22.2	14	23.56	39	29.9	31	48.98	37	41.2	1	59.70	27	70.0	27
July 9.6	47.30	25	20.8	12	23.95	32	33.0	34	49.35	33	41.3	5	59.97	24	72.7	28
19.6	47.55	21	19.6	9	24.27	25	36.4	36	49.68	28	41.8	8	60.21	19	75.5	27
29.6	47.76	16	18.7	7	24.52	18	40.0	36	49.96	22	42.6	11	60.40	15	78.2	27
Aug. 8.5	47.92	12	18.0	4	24.70	9	43.6	37	50.18	16	43.7	14	60.55	11	80.9	26
18.5	48.04	8	17.6	2	24.79	1	47.3	37	50.34	10	45.1	16	60.66	6	83.5	24
28.5	48.12	4	17.4	0	24.80	6	51.0	36	50.44	4	46.7	18	60.72	2	85.9	22
Sept. 7.5	48.16	1	17.4	2	24.74	13	54.6	33	50.48	3	48.5	19	60.74	3	88.1	19
17.4	48.15	5	17.6	4	24.61	20	57.9	31	50.45	8	50.4	19	60.71	6	90.0	17
27.4	48.10	8	18.0	5	24.41	26	61.0	28	50.37	13	52.3	18	60.65	9	91.7	14
Oct. 7.4	48.02	10	18.5	5	24.15	31	63.8	24	50.24	17	54.1	16	60.56	12	93.1	11
17.3	47.92	12	19.0	6	23.84	35	66.2	19	50.07	20	55.7	13	60.44	14	94.2	7
27.3	47.80	12	19.6	6	23.49	38	68.1	14	49.87	22	57.0	10	60.30	15	94.9	4
Nov. 6.3	47.68	13	20.2	6	23.11	40	69.5	9	49.65	22	58.0	7	60.15	15	95.3	1
16.3	47.55	12	20.8	5	22.71	40	70.4	3	49.43	21	58.7	3	60.00	14	95.4	3
26.2	47.43	11	21.3	5	22.31	39	70.7	2	49.22	19	59.0	1	59.86	14	95.1	7
Dec. 6.2	47.32	9	21.8	4	21.92	38	70.5	8	49.03	17	58.9	5	59.72	12	94.4	10
16.2	47.23	7	22.2	3	21.54	35	69.7	14	48.86	14	58.4	9	59.60	10	93.4	13
26.2	47.16	5	22.5	2	21.19	30	68.3	19	48.72	10	57.5	12	59.50	8	92.1	15
36.1	47.11		22.7		20.89		66.4		48.62		56.3		59.42		90.6	
Sec δ, Tan δ	1.032		−0.255		2.156		+1.910		1.476		−1.087		1.103		+0.465	
Mean Place	44ˢ.392		31″.91		21ˢ.830		39″.12		45ˢ.301		58″.67		57ˢ.611		71″.15	
D′ψ a, Dω a	0.00		+0.01		−0.02		−0.11		+0.01		+0.06		−0.01		−0.03	
Dψ δ, Dω δ	+0.3		−0.5		+0.3		−0.5		+0.3		−0.5		+0.3		−0.5	

Mean Solar Date.	θ Pegasi. Mag. 3.7				π Pegasi. Mag. 4.4				ζ Cephei. Mag. 3.6				24 Cephei. Mag. 5.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	22 5		+ 5 46		22 6		+32 44		22 7		+57 46		22 8		+71 54	
	s		″		s		″		s		″		s		″	
Jan. 1.1	47.70	4	5.7	10	5.93	9	66.1	18	47.62	22	28.0	21	3.99	48	55.0	20
11.1	47.66	2	4.7	10	5.84	6	64.3	21	47.40	18	25.9	25	3.51	40	53.0	25
21.1	47.64	1	3.7	10	5.78	2	62.2	22	47.22	12	23.4	28	3.11	29	50.5	29
31.1	47.65	4	2.7	9	5.76	2	60.0	22	47.10	5	20.6	29	2.82	17	47.6	31
Feb. 10.0	47.69	7	1.8	8	5.78	5	57.8	21	47.05	1	17.7	30	2.65	4	44.5	32
20.0	47.76	10	1.0	5	5.83	9	55.7	20	47.06	8	14.7	29	2.61	8	41.3	31
Mar. 2.0	47.86	14	0.5	3	5.92	13	53.7	18	47.14	16	11.8	27	2.69	21	38.2	30
12.0	48.00	17	0.2	0	6.05	18	51.9	14	47.30	23	9.1	24	2.90	34	35.2	27
21.9	48.17	20	0.2	2	6.23	22	50.5	11	47.53	30	6.7	20	3.24	45	32.5	23
31.9	48.37	23	0.4	6	6.45	25	49.4	6	47.83	35	4.7	15	3.69	55	30.2	19
Apr. 10.9	48.60	26	1.0	9	6.70	29	48.8	1	48.18	40	3.2	9	4.24	63	28.3	13
20.8	48.86	28	1.9	12	6.99	31	48.7	4	48.58	44	2.3	4	4.87	70	27.0	7
30.8	49.14	30	3.1	15	7.30	34	49.1	9	49.02	47	1.9	2	5.57	74	26.3	1
May 10.8	49.44	31	4.6	18	7.64	35	50.0	13	49.49	49	2.1	8	6.31	76	26.2	5
20.8	49.75	32	6.4	19	7.99	35	51.3	18	49.98	48	2.9	14	7.07	75	26.7	11
30.7	50.07	32	8.3	20	8.34	35	53.1	21	50.46	47	4.3	19	7.82	72	27.8	17
June 9.7	50.39	31	10.3	21	8.69	33	55.2	24	50.93	45	6.2	24	8.54	68	29.5	22
19.7	50.70	29	12.4	22	9.02	31	57.6	27	51.38	41	8.6	27	9.22	61	31.7	26
29.7	50.99	27	14.6	22	9.33	28	60.3	29	51.79	36	11.3	31	9.83	53	34.3	30
July 9.6	51.26	24	16.8	21	9.61	24	63.2	30	52.15	31	14.4	34	10.36	44	37.3	33
19.6	51.50	20	18.9	19	9.85	20	66.2	30	52.46	24	17.8	35	10.80	34	40.6	36
29.6	51.70	16	20.8	18	10.05	15	69.2	30	52.70	17	21.3	36	11.14	22	44.2	37
Aug. 8.5	51.86	12	22.6	16	10.20	11	72.2	29	52.87	11	24.9	37	11.36	11	47.9	38
18.5	51.98	7	24.2	14	10.31	6	75.1	27	52.98	4	28.6	36	11.47	1	51.7	38
28.5	52.05	3	25.6	12	10.37	1	77.8	26	53.02	3	32.2	34	11.46	11	55.5	37
Sept. 7.5	52.08	1	26.8	9	10.38	3	80.4	24	52.99	10	35.6	33	11.35	22	59.2	36
17.4	52.07	4	27.7	7	10.35	7	82.8	21	52.89	16	38.9	30	11.13	32	62.8	33
27.4	52.03	7	28.4	5	10.28	11	84.9	17	52.73	21	41.9	27	10.81	41	66.1	30
Oct. 7.4	51.96	10	28.9	2	10.17	13	86.6	14	52.52	25	44.6	23	10.40	48	69.1	27
17.3	51.86	12	29.1	1	10.04	15	88.0	10	52.27	28	46.9	18	9.92	55	71.8	22
27.3	51.74	12	29.2	1	9.89	16	89.0	7	51.99	31	48.7	14	9.37	60	74.0	18
Nov. 6.3	51.62	12	29.1	3	9.73	17	89.7	2	51.68	33	50.1	9	8.77	63	75.8	12
16.3	51.50	12	28.8	5	9.56	17	89.9	2	51.35	33	51.0	3	8.14	65	77.0	6
26.2	51.38	11	28.3	7	9.39	16	89.7	6	51.02	33	51.3	3	7.49	65	77.6	0
Dec. 6.2	51.27	9	27.6	8	9.23	15	89.1	10	50.69	31	51.0	8	6.84	63	77.6	6
16.2	51.18	8	26.8	9	9.08	12	88.1	13	50.38	28	50.2	13	6.21	59	77.0	12
26.2	51.10	6	25.9	9	8.96	10	86.8	17	50.10	25	48.9	19	5.62	52	75.8	18
36.1	51.04		25.0		8.86		85.1		49.85		47.0		5.10		74.0	
Sec δ, Tan δ	1.005		+0.101		1.189		+0.643		1.875		+1.587		3.220		+3.062	
Mean Place	$48^s.698$		10″.25		$7^s.346$		63″.43		$50^s.053$		19″.83		$8^s.254$		44″.78	
$D'_{\psi}\,a$, $D_{\omega}\,a$	0.00		−0.01		−0.01		−0.04		−0.02		−0.09		−0.04		−0.18	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	+0.3		−0.5		+0.3		−0.5		+0.4		−0.5		+0.4		−0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Aquarii. Mag. 4.3				α Tucanæ. Mag. 2.9				γ Aquarii. Mag. 4.0				31 Pegasi. Mag. 4.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	22 12		− 8 12		22 12		−60 41		22 17		− 1 49		22 17		+11 45	
	s		″		s		″		s		″		s		″	
Jan. 1.1	13.77		68.9		32.06		55.9		8.91		39.9		13.13		56.8	
11.1	13.73	4	69.3	4	31.90	16	53.9	20	8.87	4	40.6	7	13.08	5	55.6	12
21.1	13.72	1	69.6	3	31.80	10	51.6	23	8.85	2	41.2	6	13.05	3	54.4	12
31.1	13.73	1	69.8	2	31.77	3	48.9	27	8.85	0	41.7	5	13.05	0	53.2	12
Feb. 10.0	13.77	4	69.8	0	31.80	3	46.0	29	8.88	3	42.1	4	13.07	2	52.0	12
20.0	13.84	7	69.7	1	31.89	9	42.9	31	8.94	6	42.4	3	13.12	5	50.9	11
Mar. 2.0	13.94	10	69.4	3	32.05	16	39.8	31	9.03	9	42.5	1	13.21	9	50.0	9
12.0	14.07	13	68.9	5	32.28	23	36.6	32	9.16	13	42.3	2	13.33	12	49.3	7
21.9	14.23	16	68.1	8	32.57	29	33.4	32	9.32	16	41.9	4	13.49	16	48.9	4
31.9	14.43	20	67.1	10	32.91	34	30.3	31	9.51	19	41.2	7	13.68	19	48.9	0
Apr. 10.9	14.66	23	65.9	12	33.31	40	27.4	29	9.73	22	40.3	9	13.90	22	49.2	3
20.8	14.92	26	64.5	14	33.76	45	24.7	27	9.98	25	39.1	12	14.15	25	49.9	7
30.8	15.20	28	62.9	16	34.25	49	22.3	24	10.26	28	37.7	14	14.43	28	50.9	10
May 10.8	15.50	30	61.1	18	34.78	53	20.2	21	10.56	30	36.1	16	14.73	30	52.2	13
20.8	15.82	32	59.3	18	35.33	55	18.5	17	10.88	32	34.3	18	15.05	32	53.8	16
30.7	16.15	33	57.4	19	35.90	57	17.2	13	11.20	32	32.4	19	15.37	32	55.7	19
June 9.7	16.47	32	55.5	19	36.47	57	16.3	9	11.52	32	30.4	20	15.69	32	57.8	21
19.7	16.79	32	53.6	19	37.02	55	15.9	4	11.83	31	28.4	20	16.01	32	60.0	22
29.7	17.09	30	51.8	18	37.54	52	15.9	0	12.13	30	26.4	20	16.31	30	62.3	23
July 9.6	17.37	28	50.2	16	38.03	49	16.4	5	12.41	28	24.5	19	16.58	27	64.7	24
19.6	17.62	25	48.7	15	38.46	43	17.4	10	12.66	25	22.7	18	16.82	24	67.0	23
29.6	17.83	21	47.4	13	38.83	37	18.7	13	12.87	21	21.1	16	17.03	21	69.2	22
Aug. 8.5	18.00	17	46.4	10	39.13	30	20.4	17	13.04	17	19.7	14	17.20	17	71.3	21
18.5	18.13	13	45.6	8	39.34	21	22.4	20	13.17	13	18.5	12	17.33	13	73.2	19
28.5	18.22	9	45.0	6	39.46	12	24.6	22	13.26	9	17.5	10	17.41	8	75.0	18
Sept. 7.5	18.26	4	44.6	4	39.50	4	27.0	24	13.30	4	16.8	7	17.45	4	76.6	16
17.4	18.26	0	44.5	1	39.46	4	29.4	24	13.30	0	16.3	5	17.45	0	77.9	13
27.4	18.23	3	44.5	0	39.34	12	31.7	23	13.27	3	16.0	3	17.41	4	78.9	10
Oct. 7.4	18.16	7	44.7	2	39.15	19	33.8	21	13.21	6	15.9	1	17.34	7	79.7	8
17.4	18.07	9	45.1	4	38.90	25	35.7	19	13.12	9	15.9	0	17.25	9	80.2	5
27.3	17.96	11	45.5	4	38.60	30	37.3	16	13.02	10	16.1	2	17.14	11	80.5	3
Nov. 6.3	17.84	12	46.0	5	38.28	32	38.5	12	12.91	11	16.4	3	17.02	12	80.6	1
16.3	17.72	12	46.5	5	37.95	33	39.2	7	12.79	12	16.9	5	16.89	13	80.4	2
26.2	17.60	12	47.1	6	37.62	33	39.4	2	12.67	12	17.5	6	16.77	12	80.0	4
Dec. 6.2	17.49	11	47.7	6	37.30	32	39.1	3	12.56	11	18.1	6	16.65	12	79.4	6
16.2	17.40	9	48.2	5	37.01	29	38.3	8	12.47	9	18.7	6	16.55	10	78.6	8
26.2	17.33	7	48.7	5	36.77	24	37.0	13	12.39	8	19.4	7	16.46	9	77.6	10
36.1	17.27	6	49.1	4	36.58	19	35.3	17	12.33	6	20.0	6	16.39	7	76.5	11
Sec δ, Tan δ	1.010		−0.144		2.043		−1.781		1.000		−0.032		1.021		+0.208	
Mean Place	14ˢ.626		60″.55		32ˢ.956		36″.46		9ˢ.789		33″.54		14ˢ.148		59″.21	
D′ψ a, Dω a	0.00		+0.01		+0.02		+0.11		0.00		0.00		0.00		−0.01	
Dψ δ, Dω δ	+0.4		−0.5		+0.4		−0.5		+0.4		−0.4		+0.4		−0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**3 Lacertæ.** Mag. 4.6				**π Aquarii.** Mag. 4.6				**σ Aquarii.** Mag. 4.9				**α Lacertæ.** Mag. 3.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 22 20		° ′ +51 47		h m 22 20		° ′ + 0 55		h m 22 26		° ′ −11 7		h m 22 27		° ′ +49 49	
	s		″		s		″		s		″		s		″	
Jan. 1.2	6.22		42.4		49.15		62.4		1.92		33.1		40.48		73.7	
11.1	6.04	18	40.4	20	49.10	5	61.7	7	1.87	5	33.4	3	40.30	18	71.8	19
21.1	5.89	15	38.1	23	49.07	3	61.0	7	1.84	3	33.6	2	40.16	14	69.6	22
31.1	5.79	10	35.5	26	49.07	0	60.3	7	1.84	0	33.6	0	40.06	10	67.1	25
Feb. 10.0	5.74	5	32.7	28	49.10	3	59.7	6	1.87	3	33.4	2	40.01	5	64.4	27
20.0	5.75	1	29.9	28	49.16	6	59.3	4	1.92	5	33.1	3	40.01	0	61.7	27
Mar. 2.0	5.82	7	27.2	27	49.25	9	59.0	3	2.01	9	32.6	5	40.07	6	59.0	27
12.0	5.95	13	24.7	25	49.37	12	59.0	0	2.13	12	31.9	7	40.19	12	56.5	25
21.9	6.14	19	22.4	23	49.52	15	59.3	3	2.28	15	30.9	10	40.36	17	54.3	22
31.9	6.39	25	20.5	19	49.71	19	59.8	5	2.47	19	29.7	12	40.59	23	52.5	18
Apr. 10.9	6.69	30	19.1	14	49.93	22	60.6	8	2.69	22	28.3	14	40.88	29	51.1	14
20.9	7.04	35	18.2	9	50.18	25	61.7	11	2.94	25	26.8	15	41.21	33	50.2	9
30.8	7.43	39	17.9	3	50.45	27	63.0	13	3.21	27	25.1	17	41.58	37	49.9	3
May 10.8	7.84	41	18.2	3	50.75	30	64.6	16	3.51	30	23.3	18	41.98	40	50.1	2
20.8	8.27	43	19.0	8	51.06	31	66.4	18	3.83	32	21.4	19	42.40	42	50.9	8
30.7	8.71	44	20.3	13	51.38	32	68.3	19	4.16	33	19.4	20	42.83	43	52.2	13
June 9.7	9.14	43	22.1	18	51.70	32	70.3	20	4.49	33	17.5	19	43.25	42	54.0	18
19.7	9.55	41	24.4	23	52.02	32	72.4	21	4.81	32	15.6	19	43.65	40	56.3	23
29.7	9.93	38	27.1	27	52.32	30	74.4	20	5.12	31	13.9	17	44.03	38	58.9	26
July 9.6	10.28	35	30.1	30	52.59	27	76.4	20	5.41	29	12.3	16	44.38	35	61.8	29
19.6	10.58	30	33.3	32	52.84	25	78.3	19	5.67	26	10.9	14	44.68	30	65.0	32
29.6	10.82	24	36.7	34	53.06	22	80.0	17	5.89	22	9.7	12	44.93	25	68.4	34
Aug. 8.6	11.01	19	40.2	35	53.23	17	81.6	16	6.08	19	8.8	9	45.12	19	71.9	35
18.5	11.14	13	43.7	35	53.36	13	83.0	14	6.23	15	8.1	7	45.26	14	75.3	34
28.5	11.20	6	47.2	35	53.45	9	84.1	11	6.33	10	7.7	4	45.34	8	78.7	34
Sept. 7.5	11.20	0	50.6	34	53.50	5	85.0	9	6.38	5	7.5	2	45.36	2	82.0	33
17.4	11.15	5	53.7	31	53.51	1	85.7	7	6.39	1	7.5	0	45.33	3	85.1	31
27.4	11.05	10	56.6	29	53.48	3	86.2	5	6.37	2	7.7	2	45.25	8	88.0	29
Oct. 7.4	10.90	15	59.2	26	53.42	6	86.4	2	6.31	6	8.1	4	45.12	13	90.6	26
17.4	10.71	19	61.4	22	53.33	9	86.5	1	6.23	8	8.6	5	44.95	17	92.8	22
27.3	10.49	22	63.2	18	53.23	10	86.4	1	6.13	10	9.2	6	44.75	20	94.6	18
Nov. 6.3	10.25	24	64.5	13	53.12	11	86.1	3	6.02	11	9.8	6	44.53	22	95.9	13
16.3	9.99	26	65.4	9	53.00	12	85.7	4	5.90	12	10.4	6	44.29	24	96.8	9
26.3	9.72	27	65.7	3	52.88	12	85.2	5	5.78	12	11.0	6	44.04	25	97.2	4
Dec. 6.2	9.46	26	65.5	2	52.77	11	84.6	6	5.67	11	11.5	5	43.80	24	97.1	1
16.2	9.21	25	64.8	7	52.68	9	83.9	7	5.57	10	12.0	5	43.57	23	96.4	7
26.2	8.98	23	63.5	13	52.60	8	83.2	7	5.49	8	12.4	4	43.35	22	95.2	12
36.1	8.78	20	61.8	17	52.54	6	82.4	8	5.42	7	12.8	4	43.15	20	93.6	16
Sec δ, Tan δ	1.617		+1.271		1.000		+0.016		1.019		−0.197		1.550		+1.185	
Mean Place	$8^{s}.213$		$34''.42$		$50^{s}.036$		$67''.89$		$2^{s}.682$		$24''.32$		$42^{s}.328$		$65''.60$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.01		−0.08		0.00		0.00		0.00		+0.01		−0.01		−0.07	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.4		−0.4		+0.4		−0.4		+0.4		−0.4		+0.4		−0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	υ Aquarii. Mag. 5.3				226 B. Cephei. Mag. 5.7				η Aquarii. Mag. 4.1				10 Lacertæ. Mag. 4.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	22 29		−21 8		22 30		+75 46		22 30		− 0 33		22 35		+38 35	
	s		″		s		″		s		″		s		″	
Jan. 1.2	55.47	5	87.1	2	39.90	68	53.3	18	52.35	6	63.8	7	19.94	13	55.7	17
11.1	55.42	3	86.9	3	39.22	59	51.5	22	52.29	3	64.5	7	19.81	10	54.0	20
21.1	55.39	0	86.6	5	38.63	47	49.3	26	52.26	1	65.2	6	19.71	7	52.0	22
31.1	55.39	2	86.1	8	38.16	32	46.7	29	52.25	2	65.8	5	19.64	3	49.8	23
Feb. 10.0	55.41	5	85.3	10	37.84	16	43.8	31	52.27	5	66.3	3	19.61	1	47.5	23
20.0	55.46	9	84.3	11	37.68	0	40.7	32	52.32	8	66.6	1	19.62	6	45.2	23
Mar. 2.0	55.55	12	83.2	13	37.68	17	37.5	31	52.40	11	66.7	1	19.68	10	42.9	21
12.0	55.67	16	81.9	15	37.85	33	34.4	29	52.51	15	66.6	3	19.78	15	40.8	17
21.9	55.83	19	80.4	17	38.18	48	31.5	25	52.66	18	66.3	6	19.93	20	39.1	14
31.9	56.02	22	78.7	18	38.66	62	29.0	21	52.84	21	65.7	9	20.13	24	37.7	10
Apr. 10.9	56.24	26	76.9	19	39.28	74	26.9	16	53.05	24	64.8	12	20.37	28	36.7	5
20.9	56.50	29	75.0	20	40.02	83	25.3	11	53.29	27	63.6	14	20.65	32	36.2	0
30.8	56.79	31	73.0	21	40.85	89	24.2	5	53.56	29	62.2	16	20.97	35	36.2	5
May 10.8	57.10	32	70.9	20	41.74	92	23.7	1	53.85	31	60.6	18	21.32	36	36.7	10
20.8	57.42	34	68.9	19	42.66	93	23.8	7	54.16	32	58.8	19	21.68	37	37.7	14
30.7	57.76	35	67.0	18	43.59	91	24.5	13	54.48	32	56.9	20	22.05	37	39.1	19
June 9.7	58.11	34	65.2	17	44.50	87	25.8	19	54.80	32	54.9	21	22.42	36	41.0	23
19.7	58.45	32	63.5	15	45.37	80	27.7	24	55.12	31	52.8	20	22.78	34	43.3	26
29.7	58.77	30	62.0	12	46.17	71	30.1	28	55.43	28	50.8	20	23.12	32	45.9	28
July 9.6	59.07	28	60.8	9	46.88	60	32.9	31	55.71	25	48.8	18	23.44	28	48.7	30
19.6	59.35	24	59.9	7	47.48	48	36.0	34	55.96	22	47.0	17	23.72	24	51.7	31
29.6	59.59	20	59.2	4	47.96	35	39.4	37	56.18	19	45.3	15	23.96	19	54.8	31
Aug. 8.6	59.79	16	58.8	1	48.31	21	43.1	38	56.37	14	43.8	13	24.15	15	57.9	31
18.5	59.95	11	58.7	1	48.52	7	46.9	38	56.51	10	42.5	11	24.30	9	61.0	30
28.5	60.06	6	58.8	4	48.59	6	50.7	38	56.61	6	41.4	8	24.39	4	64.0	29
Sept. 7.5	60.12	2	59.2	6	48.53	20	54.5	37	56.67	2	40.6	6	24.43	0	66.9	27
17.4	60.14	2	59.8	8	48.33	33	58.2	35	56.69	2	40.0	4	24.43	5	69.6	25
27.4	60.12	6	60.6	9	48.00	45	61.7	33	56.67	5	39.6	2	24.38	8	72.1	22
Oct. 7.4	60.06	9	61.5	9	47.55	55	65.0	30	56.62	8	39.4	0	24.30	12	74.3	18
17.4	59.97	11	62.4	9	47.00	64	68.0	26	56.54	10	39.4	2	24.18	14	76.1	14
27.3	59.86	12	63.3	9	46.36	72	70.6	21	56.44	11	39.6	3	24.04	16	77.5	11
Nov. 6.3	59.74	13	64.2	8	45.64	78	72.7	16	56.33	11	39.9	4	23.88	17	78.6	7
16.3	59.61	13	65.0	6	44.86	82	74.3	11	56.22	11	40.3	5	23.71	18	79.3	2
26.3	59.48	12	65.6	5	44.04	84	75.4	4	56.11	11	40.8	6	23.53	18	79.5	3
Dec. 6.2	59.36	10	66.1	3	43.20	83	75.8	2	56.00	10	41.4	7	23.35	17	79.2	7
16.2	59.26	9	66.4	2	42.37	79	75.6	8	55.90	8	42.1	7	23.18	16	78.5	11
26.2	59.17	7	66.6	0	41.58	73	74.8	14	55.82	7	42.8	7	23.02	14	77.4	15
36.1	59.10		66.6		40.85		73.4		55.75		43.5		22.88		75.9	
Sec δ, Tan δ	1.072		−0.387		4.071		+3.947		1.000		−0.010		1.279		+0.798	
Mean Place	56^{s}.159		75″.56		44^{s}.973		40″.83		53^{s}.171		58″.29		21^{s}.347		49″.70	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	0.00		+0.02		−0.04		−0.24		0.00		0.00		−0.01		−0.05	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.4		−0.4		+0.4		−0.4		+0.4		−0.4		+0.4		−0.4	

Mean Solar Date.	ε Piscis Australis. Mag. 4.2				ζ Pegasi. Mag. 3.6				β Octantis. Mag. 4.3				β Gruis. Mag. 2.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 22 35		° ′ −27 29		h m 22 37		° ′ +10 22		h m 22 37		° ′ −81 49		h m 22 37		° ′ −47 20	
	s		″		s		″		s		″		s		″	
Jan. 1.2	50.13		65.4		6.46		34.7		12.32		98.6		28.09		41.5	
11.1	50.06	7	65.0	4	6.39	7	33.7	10	11.37	95	96.1	25	27.98	11	40.2	13
21.1	50.02	4	64.3	7	6.34	5	32.6	11	10.63	74	93.1	30	27.90	8	38.6	16
31.1	50.01	1	63.4	9	6.32	2	31.5	11	10.11	52	89.8	33	27.86	4	36.7	19
Feb. 10.1	50.03	2	62.3	11	6.33	1	30.4	11	9.82	29	86.2	36	27.86	0	34.5	22
20.0	50.08	5	61.0	13	6.37	4	29.4	10	9.77	5	82.5	37	27.91	5	32.0	25
Mar. 2.0	50.16	8	59.5	15	6.44	7	28.6	8	9.96	19	78.7	38	28.00	9	29.4	26
12.0	50.28	12	57.8	17	6.54	10	28.1	5	10.39	43	74.9	38	28.14	14	26.7	27
21.9	50.44	16	55.9	19	6.68	14	27.8	3	11.04	65	71.1	38	28.33	19	23.9	28
31.9	50.63	19	53.9	20	6.85	17	27.8	0	11.90	86	67.5	36	28.56	23	21.0	29
Apr. 10.9	50.86	23	51.8	21	7.06	21	28.2	4	12.96	106	64.2	33	28.83	27	18.2	28
20.9	51.12	26	49.6	22	7.30	24	28.9	7	14.19	123	61.2	30	29.15	32	15.5	27
30.8	51.41	29	47.4	22	7.57	27	29.9	10	15.57	138	58.6	26	29.51	36	12.9	26
May 10.8	51.73	32	45.3	21	7.86	29	31.2	13	17.07	150	56.4	22	29.89	38	10.5	24
20.8	52.07	34	43.2	21	8.17	31	32.8	16	18.66	159	54.6	18	30.30	41	8.4	21
30.8	52.42	35	41.2	20	8.49	32	34.6	18	20.31	165	53.3	13	30.73	43	6.6	18
June 9.7	52.77	35	39.4	18	8.82	33	36.6	20	21.98	167	52.6	7	31.17	44	5.1	15
19.7	53.12	35	37.8	16	9.14	32	38.8	22	23.62	164	52.4	2	31.60	43	4.0	11
29.7	53.46	34	36.5	13	9.44	30	41.1	23	25.20	158	52.8	4	32.02	42	3.3	7
July 9.6	53.78	32	35.5	10	9.72	28	43.4	23	26.68	148	53.7	9	32.41	39	3.0	3
19.6	54.07	29	34.8	7	9.98	26	45.6	22	28.01	133	55.1	14	32.77	36	3.2	2
29.6	54.33	26	34.4	4	10.21	23	47.8	22	29.16	115	57.0	19	33.08	31	3.8	6
Aug. 8.6	54.54	21	34.3	1	10.40	19	49.9	21	30.09	93	59.2	22	33.34	26	4.7	9
18.5	54.71	17	34.6	3	10.54	14	51.8	19	30.78	69	61.7	25	33.55	21	6.0	13
28.5	54.83	12	35.1	5	10.64	10	53.5	17	31.20	42	64.5	28	33.69	14	7.6	16
Sept. 7.5	54.90	7	35.9	8	10.70	6	55.0	15	31.33	13	67.4	29	33.77	8	9.4	18
17.5	54.92	2	36.8	9	10.72	2	56.2	12	31.17	16	70.3	29	33.79	2	11.3	19
27.4	54.90	2	37.9	11	10.71	1	57.2	10	30.74	43	73.1	28	33.75	4	13.3	20
Oct. 7.4	54.84	6	39.1	12	10.66	5	58.0	8	30.05	69	75.7	26	33.66	9	15.3	20
17.4	54.75	9	40.3	12	10.58	8	58.5	5	29.13	92	78.0	23	33.52	14	17.1	18
27.3	54.64	11	41.4	11	10.49	9	58.8	3	28.01	112	79.9	19	33.35	17	18.7	16
Nov. 6.3	54.51	13	42.4	10	10.38	11	58.9	1	26.74	127	81.3	14	33.15	20	20.1	14
16.3	54.37	14	43.3	9	10.26	12	58.8	1	25.38	136	82.1	8	32.94	21	21.1	10
26.3	54.23	14	44.0	7	10.14	12	58.4	4	23.97	141	82.3	2	32.73	21	21.8	7
Dec. 6.2	54.10	13	44.5	5	10.03	11	57.8	6	22.57	140	81.8	5	32.53	20	22.0	2
16.2	53.98	12	44.7	2	9.93	10	57.1	7	21.24	133	80.7	11	32.34	19	21.8	2
26.2	53.88	10	44.7	0	9.84	9	56.2	9	20.02	122	79.0	17	32.17	17	21.2	6
36.2	53.80	8	44.5	2	9.76	8	55.2	10	18.95	107	76.8	22	32.04	13	20.2	10
Sec δ, Tan δ	1.127		−0.521		1.017		+0.183		7.042		−6.972		1.476		−1.085	
Mean Place	$50^{s}.755$		$52''.31$		$7^{s}.360$		$36''.72$		$13^{s}.726$		$77''.38$		$28^{s}.656$		$23''.92$	
$D'_{\psi} a$, $D_{\omega} a$	0.00		+0.03		0.00		−0.01		+0.07		+0.44		+0.01		+0.07	
$D_{\psi} \delta$, $D_{\omega} \delta$	+0.4		−0.4		+0.4		−0.4		+0.4		−0.4		+0.4		−0.4	

Mean Solar Date.	η Pegasi. Mag. 3.1				λ Pegasi. Mag. 4.1				ε Gruis. Mag. 3.7				τ' Aquarii. Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	22 38		+29 45		22 42		+23 6		22 43		−51 46		22 44		−14 2	
	s		″		s		″		s		″		s		″	
Jan. 1.2	54.14		60.8		19.29		29.3		17.77		46.7		58.59		76.4	
11.1	54.04	10	59.3	15	19.20	9	27.9	14	17.63	14	45.3	14	58.53	6	76.6	2
21.1	53.97	7	57.6	17	19.13	7	26.4	15	17.53	10	43.5	18	58.49	4	76.6	0
31.1	53.92	5	55.7	19	19.09	4	24.8	16	17.47	6	41.4	21	58.47	2	76.5	1
Feb. 10.1	53.90	2	53.7	20	19.08	1	23.1	17	17.46	1	38.9	25	58.48	1	76.2	3
20.0	53.92	2	51.7	20	19.10	2	21.4	17	17.49	3	36.2	27	58.52	4	75.7	5
Mar. 2.0	53.98	6	49.9	18	19.16	6	19.9	15	17.57	8	33.4	28	58.59	7	75.0	7
12.0	54.08	10	48.3	16	19.26	10	18.7	12	17.71	14	30.5	29	58.69	10	74.0	10
21.9	54.22	14	46.9	14	19.39	13	17.7	10	17.90	19	27.5	30	58.82	13	72.8	12
31.9	54.40	18	45.9	10	19.56	17	17.0	7	18.14	24	24.5	30	58.99	17	71.4	14
Apr. 10.9	54.62	22	45.3	6	19.77	21	16.7	3	18.42	28	21.5	30	59.20	21	69.9	15
20.9	54.88	26	45.1	2	20.02	25	16.8	1	18.75	33	18.6	29	59.44	24	68.2	17
30.8	55.17	29	45.4	3	20.30	28	17.3	5	19.12	37	15.9	27	59.71	27	66.3	19
May 10.8	55.48	31	46.1	7	20.60	30	18.2	9	19.53	41	13.5	24	60.00	29	64.3	20
20.8	55.82	34	47.3	12	20.92	32	19.5	13	19.97	44	11.3	22	60.31	31	62.3	20
30.8	56.17	35	48.9	16	21.26	34	21.2	17	20.43	46	9.5	18	60.64	33	60.3	20
June 9.7	56.52	35	50.8	19	21.60	34	23.2	20	20.90	47	8.0	15	60.97	33	58.3	20
19.7	56.86	34	53.1	23	21.93	33	25.4	22	21.37	47	7.0	10	61.30	33	56.4	19
29.7	57.19	33	55.6	25	22.25	32	27.8	24	21.82	45	6.4	6	61.62	32	54.7	17
July 9.6	57.49	30	58.3	27	22.54	29	30.4	26	22.24	42	6.2	2	61.92	30	53.2	15
19.6	57.76	27	61.1	28	22.81	27	33.1	27	22.62	38	6.5	3	62.19	27	51.9	13
29.6	57.99	23	64.0	29	23.04	23	35.7	26	22.96	34	7.2	7	62.43	24	50.8	11
Aug. 8.6	58.18	19	66.8	28	23.23	19	38.3	26	23.25	29	8.3	11	62.64	21	50.0	8
18.5	58.33	15	69.6	28	23.38	15	40.8	25	23.48	23	9.8	15	62.81	17	49.4	6
28.5	58.43	10	72.3	27	23.48	10	43.2	24	23.64	16	11.6	18	62.93	12	49.1	3
Sept. 7.5	58.48	5	74.8	25	23.54	6	45.4	22	23.73	9	13.6	20	63.00	7	49.1	0
17.5	58.49	1	77.1	23	23.56	2	47.4	20	23.75	2	15.7	21	63.03	3	49.3	2
27.4	58.46	3	79.1	20	23.54	2	49.1	17	23.71	4	17.9	22	63.03	0	49.7	4
Oct. 7.4	58.39	7	80.9	18	23.49	5	50.5	14	23.61	10	20.0	21	62.99	4	50.2	5
17.4	58.30	9	82.4	15	23.41	8	51.6	11	23.46	15	22.0	20	62.92	7	50.8	6
27.3	58.18	12	83.5	11	23.31	10	52.5	9	23.27	19	23.8	18	62.83	9	51.5	7
Nov. 6.3	58.05	13	84.3	8	23.19	12	53.1	6	23.05	22	25.2	14	62.72	11	52.3	8
16.3	57.91	14	84.7	4	23.06	13	53.3	2	22.81	24	26.3	11	62.60	12	53.0	7
26.3	57.76	15	84.7	0	22.92	14	53.2	1	22.57	24	27.0	7	62.48	12	53.7	7
Dec. 6.2	57.61	15	84.3	4	22.79	13	52.8	4	22.33	24	27.2	2	62.37	11	54.3	6
16.2	57.47	14	83.6	7	22.67	12	52.1	7	22.11	22	27.0	2	62.27	10	54.8	5
26.2	57.34	13	82.6	10	22.56	11	51.1	10	21.92	19	26.3	7	62.18	9	55.2	4
36.2	57.23	11	81.2	14	22.46	10	49.8	13	21.75	17	25.2	11	62.10	8	55.4	2
Sec δ, Tan δ	1.152		+0.572		1.087		+0.427		1.616		−1.270		1.031		−0.250	
Mean Place	55ˢ.329		56″.98		20ˢ.335		27″.18		18ˢ.282		28″.29		59ˢ.240		67″.23	
D′ψ α, Dω α	−0.01		−0.04		0.00		−0.03		+0.01		+0.08		0.00		+0.02	
Dψ δ, Dω δ	+0.4		−0.3		+0.4		−0.3		+0.4		−0.3		+0.4		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ Pegasi. Mag. 3.7 Right Ascension.		μ Pegasi. Declination N.		ι Cephei. Mag. 3.7 Right Ascension.		ι Cephei. Declination N.		λ Aquarii. Mag. 3.8 Right Ascension.		λ Aquarii. Declination S.		ρ Indi. Mag. 6.1 Right Ascension.		ρ Indi. Declination S.	
	h m 22 45 s		° ′ +24 8 ″		h m 22 46 s		° ′ +65 44 ″		h m 22 48 s		° ′ − 8 2 ″		h m 22 48 s		° ′ −70 31 ″	
Jan. 1.2	47.13		33.6		31.96		45.8		3.92		41.4		36.57		100.4	
11.1	47.04	9	32.2	14	31.58	38	44.1	17	3.85	7	41.8	4	36.21	36	98.3	21
21.1	46.97	7	30.6	16	31.25	33	42.0	21	3.81	4	42.1	3	35.92	29	95.8	25
31.1	46.92	5	28.9	17	30.99	26	39.5	25	3.79	2	42.3	2	35.72	20	92.9	29
Feb. 10.1	46.91	1	27.2	17	30.81	18	36.7	28	3.80	1	42.3	0	35.61	11	89.7	32
20.0	46.93	2	25.6	16	30.72	9	33.7	30	3.83	3	42.2	1	35.59	2	86.3	34
Mar. 2.0	46.98	5	24.1	15	30.72	0	30.7	30	3.89	6	41.8	4	35.67	8	82.7	36
12.0	47.07	9	22.8	13	30.82	10	27.7	30	3.99	10	41.2	6	35.85	18	79.1	36
22.0	47.20	13	21.7	11	31.01	19	24.9	28	4.12	13	40.4	8	36.13	28	75.5	36
31.9	47.37	17	20.9	8	31.29	28	22.5	24	4.28	16	39.4	10	36.50	37	72.0	35
Apr. 10.9	47.58	21	20.5	4	31.66	37	20.5	20	4.48	20	38.1	13	36.96	46	68.6	34
20.9	47.82	24	20.6	1	32.11	45	19.0	15	4.71	23	36.6	15	37.50	54	65.5	31
30.8	48.10	28	21.1	5	32.62	51	18.0	10	4.97	26	34.9	17	38.11	61	62.6	29
May 10.8	48.41	31	22.0	9	33.18	56	17.6	4	5.26	29	33.1	18	38.78	67	60.1	25
20.8	48.73	32	23.2	12	33.77	59	17.8	2	5.57	31	31.2	19	39.50	72	58.0	21
30.8	49.07	34	24.8	16	34.38	61	18.5	7	5.89	32	29.2	20	40.25	75	56.4	16
June 9.7	49.41	34	26.8	20	34.98	60	19.8	13	6.22	33	27.2	20	41.02	77	55.3	11
19.7	49.74	33	29.0	22	35.56	58	21.7	19	6.54	32	25.2	20	41.79	77	54.7	6
29.7	50.06	32	31.4	24	36.11	55	24.0	23	6.85	31	23.3	19	42.53	74	54.6	1
July 9.7	50.36	30	34.0	26	36.61	50	26.7	27	7.15	30	21.6	17	43.23	70	55.0	4
19.6	50.63	27	36.7	27	37.05	44	29.8	31	7.42	27	20.0	16	43.87	64	55.9	9
29.6	50.87	24	39.4	27	37.41	36	33.2	34	7.66	24	18.6	14	44.44	57	57.3	14
Aug. 8.6	51.07	20	42.0	26	37.70	29	36.8	36	7.86	20	17.4	12	44.91	47	59.1	18
18.5	51.22	15	44.6	26	37.91	21	40.5	37	8.02	16	16.5	9	45.28	37	61.3	22
28.5	51.33	11	47.0	24	38.03	12	44.2	37	8.14	12	15.9	6	45.53	25	63.8	25
Sept. 7.5	51.39	6	49.2	22	38.07	4	47.9	37	8.22	8	15.5	4	45.66	13	66.4	26
17.5	51.41	2	51.2	20	38.02	5	51.5	36	8.26	4	15.3	2	45.66	0	69.1	27
27.4	51.39	2	53.0	18	37.89	13	55.0	35	8.26	0	15.3	0	45.54	12	71.8	27
Oct. 7.4	51.34	5	54.5	15	37.69	20	58.2	32	8.22	4	15.5	2	45.31	23	74.4	26
17.4	51.27	7	55.7	12	37.42	27	61.1	29	8.16	6	15.9	4	44.98	33	76.8	24
27.4	51.17	10	56.6	9	37.10	32	63.6	25	8.07	9	16.4	5	44.57	41	78.8	20
Nov. 6.3	51.05	12	57.2	6	36.73	37	65.6	20	7.97	10	17.0	6	44.09	48	80.4	16
16.3	50.92	13	57.5	3	36.33	40	67.1	15	7.86	11	17.6	6	43.57	52	81.5	11
26.3	50.79	13	57.5	0	35.90	43	68.1	10	7.75	11	18.2	6	43.03	54	82.0	5
Dec. 6.2	50.66	13	57.1	4	35.46	44	68.5	4	7.64	11	18.8	6	42.49	54	81.9	1
16.2	50.53	13	56.4	7	35.02	44	68.3	2	7.54	10	19.4	6	41.98	51	81.3	6
26.2	50.41	12	55.4	10	34.59	43	67.6	7	7.45	9	19.9	5	41.51	47	80.1	12
36.2	50.31	10	54.2	12	34.19	40	66.3	13	7.37	8	20.3	4	41.10	41	78.4	17
Sec δ, Tan δ	1.096		+0.448		2.434		+2.219		1.010		−0.141		3.001		−2.830	
Mean Place	$48^{s}.176$		$30''.97$		$34^{s}.797$		$33''.37$		$4^{s}.589$		$34''.12$		$37^{s}.089$		$79''.58$	
$D'_{\psi}\,a$, $D_{\omega}\,a$	0.00		−0.03		−0.02		−0.14		0.00		+0.01		+0.02		+0.18	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	+0.4		−0.3		+0.4		−0.3		+0.4		−0.3		+0.4		−0.3	

Mean Solar Date.	**δ Aquarii.** Mag. 3.5				**α Piscis Australis.** Mag. 1.3				**ο Andromedæ.** Mag. 3.6				**β Pegasi.** Var. 2.2–2.7			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	22 50		−16 16		22 52		−30 4		22 57		+41 51		22 59		+27 36	
	s		″		s		″		s		″		s		″	
Jan. 1.2	1.46	6	71.2	1	50.26	8	74.6	4	53.53	15	37.7	15	32.26	11	42.6	13
11.1	1.40	5	71.3	1	50.18	6	74.2	7	53.38	13	36.2	19	32.15	9	41.3	16
21.1	1.35	2	71.2	2	50.12	3	73.5	10	53.25	10	34.3	22	32.06	6	39.7	17
31.1	1.33	0	71.0	4	50.09	0	72.5	13	53.15	6	32.1	23	32.00	3	38.0	18
Feb. 10.1	1.33	3	70.6	7	50.09	3	71.2	15	53.09	2	29.8	23	31.97	0	36.2	18
20.0	1.36	6	69.9	9	50.12	6	69.7	17	53.07	2	27.5	23	31.97	3	34.4	17
Mar. 2.0	1.42	10	69.0	11	50.18	10	68.0	19	53.09	7	25.2	22	32.00	8	32.7	15
12.0	1.52	13	67.9	13	50.28	14	66.1	20	53.16	13	23.0	20	32.08	12	31.2	12
22.0	1.65	17	66.6	15	50.42	18	64.1	22	53.29	18	21.0	16	32.20	16	30.0	9
31.9	1.82	20	65.1	16	50.60	21	61.9	23	53.47	23	19.4	12	32.36	20	29.1	6
Apr. 10.9	2.02	23	63.5	18	50.81	25	59.6	23	53.70	27	18.2	8	32.56	24	28.5	2
20.9	2.25	27	61.7	20	51.06	28	57.3	24	53.97	31	17.4	3	32.80	27	28.3	3
30.8	2.52	29	59.7	20	51.34	32	54.9	23	54.28	35	17.1	2	33.07	31	28.6	7
May 10.8	2.81	32	57.7	21	51.66	34	52.6	22	54.63	37	17.3	7	33.38	33	29.3	11
20.8	3.13	33	55.6	20	52.00	35	50.4	21	55.00	38	18.0	12	33.71	34	30.4	15
30.8	3.46	33	53.6	20	52.35	36	48.3	19	55.38	39	19.2	17	34.05	35	31.9	18
June 9.7	3.79	33	51.6	19	52.71	36	46.4	16	55.77	38	20.9	20	34.40	34	33.7	21
19.7	4.12	32	49.7	17	53.07	35	44.8	13	56.15	37	22.9	24	34.74	33	35.8	24
29.7	4.44	31	48.0	15	53.42	34	43.5	10	56.52	34	25.3	27	35.07	31	38.2	26
July 9.7	4.75	28	46.5	13	53.76	31	42.5	7	56.86	31	28.0	29	35.38	29	40.8	27
19.6	5.03	25	45.2	10	54.07	27	41.8	4	57.17	27	30.9	31	35.67	25	43.5	28
29.6	5.28	21	44.2	7	54.34	23	41.4	0	57.44	22	34.0	32	35.92	21	46.3	27
Aug. 8.6	5.49	17	43.5	4	54.57	19	41.4	3	57.66	18	37.2	32	36.13	17	49.0	27
18.5	5.66	13	43.1	2	54.76	14	41.7	7	57.84	13	40.4	32	36.30	12	51.7	26
28.5	5.79	8	42.9	1	54.90	9	42.4	9	57.97	7	43.6	31	36.42	8	54.3	24
Sept. 7.5	5.87	4	43.0	3	54.99	4	43.3	11	58.04	2	46.7	29	36.50	4	56.7	23
17.5	5.91	0	43.3	5	55.03	0	44.4	12	58.06	2	49.6	26	36.54	1	59.0	20
27.4	5.91	4	43.8	7	55.03	4	45.6	13	58.04	6	52.2	24	36.53	4	61.0	17
Oct. 7.4	5.87	7	44.5	8	54.99	8	46.9	14	57.98	10	54.6	21	36.49	7	62.7	14
17.4	5.80	9	45.3	8	54.91	11	48.3	13	57.88	13	56.7	18	36.42	9	64.1	12
27.4	5.71	11	46.1	8	54.80	13	49.6	12	57.75	15	58.5	14	36.33	11	65.3	8
Nov. 6.3	5.60	11	46.9	8	54.67	14	50.8	10	57.60	17	59.9	9	36.22	13	66.1	5
16.3	5.49	12	47.7	7	54.53	14	51.8	8	57.43	18	60.8	5	36.09	13	66.6	1
26.3	5.37	12	48.4	6	54.39	14	52.6	6	57.25	19	61.3	0	35.96	14	66.7	2
Dec. 6.2	5.25	11	49.0	5	54.25	13	53.2	3	57.06	18	61.3	4	35.82	13	66.5	6
16.2	5.14	9	49.5	3	54.12	11	53.5	1	56.88	18	60.9	9	35.69	13	65.9	9
26.2	5.05	7	49.8	2	54.01	9	53.6	3	56.70	17	60.0	13	35.56	11	65.0	12
36.2	4.98		50.0		53.92		53.3		56.53		58.7		35.45		63.8	
Sec δ, Tan δ	1.042		−0.292		1.156		−0.579		1.343		+0.896		1.129		+0.523	
Mean Place	2ˢ.062		61″.49		50ˢ.766		61″.07		54ˢ.897		29″.47		33ˢ.287		38″.27	
D′ψ α, Dω α	0.00		+0.02		0.00		+0.04		−0.01		−0.06		0.00		−0.03	
Dψ δ, Dω δ	+0.4		−0.3		+0.4		−0.3		+0.4		−0.3		+0.4		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*α* **Pegasi.** Mag. 2.6				**55 Pegasi.** Mag. 4.7				c^2 **Aquarii.** Mag. 3.8				*π* **Cephei.** Mag. 4.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 0		+14 44		23 2		+ 8 56		23 4		−21 38		23 5		+74 54	
	s		″		s		″		s		″		s		″	
Jan. 1.2	24.73		13.5		36.51		20.0		48.09		52.7		3.42		76.3	
11.2	24.64	9	12.4	11	36.43	8	19.1	9	48.01	8	52.6	1	2.73	69	75.0	13
21.1	24.57	7	11.2	12	36.37	6	18.1	10	47.95	6	52.3	3	2.11	62	73.1	19
31.1	24.53	4	9.9	13	36.33	4	17.1	10	47.91	4	51.8	5	1.59	52	70.8	23
Feb. 10.1	24.51	2	8.7	12	36.31	2	16.2	9	47.90	1	51.0	8	1.19	40	68.1	27
20.0	24.52	1	7.6	11	36.32	1	15.4	8	47.92	2	50.0	10	0.93	26	65.2	29
Mar. 2.0	24.56	4	6.6	10	36.36	4	14.7	7	47.97	5	48.8	12	0.82	11	62.1	31
12.0	24.64	8	5.8	8	36.44	8	14.2	5	48.05	8	47.4	14	0.86	4	59.0	31
22.0	24.76	12	5.3	5	36.55	11	14.0	2	48.17	12	45.8	16	1.06	20	56.0	30
31.9	24.91	15	5.0	3	36.70	15	14.1	1	48.32	15	44.0	18	1.41	35	53.3	27
Apr. 10.9	25.10	19	5.1	1	36.89	19	14.5	4	48.51	19	42.1	19	1.90	49	50.9	24
20.9	25.32	22	5.5	4	37.11	22	15.2	7	48.74	23	40.0	21	2.52	62	49.0	19
30.9	25.58	26	6.3	8	37.36	25	16.2	10	49.00	26	37.8	22	3.25	73	47.6	14
May 10.8	25.87	29	7.4	11	37.64	28	17.5	13	49.29	29	35.6	22	4.06	81	46.7	9
20.8	26.18	31	8.9	15	37.94	30	19.1	16	49.60	31	33.4	22	4.92	86	46.4	3
30.8	26.50	32	10.6	17	38.26	32	20.9	18	49.93	33	31.2	22	5.81	89	46.7	3
June 9.7	26.83	33	12.6	20	38.58	32	22.9	20	50.27	34	29.1	21	6.71	90	47.6	9
19.7	27.15	32	14.7	21	38.91	33	25.1	22	50.62	35	27.3	18	7.59	88	49.1	15
29.7	27.47	32	17.0	23	39.23	32	27.3	22	50.96	34	25.7	16	8.42	83	51.1	20
July 9.7	27.77	30	19.4	24	39.53	30	29.5	22	51.28	32	24.3	14	9.18	76	53.5	24
19.6	28.04	27	21.8	24	39.80	27	31.7	22	51.57	29	23.2	11	9.86	68	56.4	29
29.6	28.28	24	24.1	23	40.04	24	33.9	22	51.84	27	22.4	8	10.44	58	59.6	32
Aug. 8.6	28.49	21	26.3	22	40.25	21	35.9	20	52.07	23	21.9	5	10.91	47	63.1	35
18.6	28.66	17	28.4	21	40.42	17	37.7	18	52.26	19	21.7	2	11.25	34	66.8	37
28.5	28.79	13	30.4	20	40.55	13	39.3	16	52.40	14	21.8	1	11.47	22	70.6	38
Sept. 7.5	28.87	8	32.2	18	40.63	8	40.7	14	52.50	10	22.2	4	11.56	9	74.4	38
17.5	28.91	4	33.7	15	40.68	5	41.9	12	52.55	5	22.8	6	11.52	4	78.2	38
27.4	28.92	1	35.0	13	40.69	1	42.9	10	52.56	1	23.6	8	11.36	16	81.9	37
Oct. 7.4	28.89	3	36.0	10	40.67	2	43.6	7	52.53	3	24.6	10	11.08	28	85.4	35
17.4	28.83	6	36.8	8	40.62	5	44.1	5	52.47	6	25.6	10	10.69	39	88.7	33
27.4	28.75	8	37.3	5	40.54	8	44.4	3	52.39	8	26.7	11	10.20	49	91.6	29
Nov. 6.3	28.65	10	37.6	3	40.44	10	44.5	1	52.29	10	27.7	10	9.62	58	94.1	25
16.3	28.54	11	37.7	1	40.34	10	44.3	2	52.17	12	28.6	9	8.97	65	96.1	20
26.3	28.43	11	37.5	2	40.23	11	44.0	3	52.05	12	29.4	8	8.26	71	97.6	15
Dec. 6.3	28.31	12	37.1	4	40.12	11	43.5	5	51.93	12	30.1	7	7.52	74	98.5	9
16.2	28.20	11	36.4	7	40.02	10	42.9	6	51.82	11	30.6	5	6.76	76	98.8	3
26.2	28.10	10	35.6	8	39.92	10	42.1	8	51.71	11	30.9	3	6.01	75	98.5	3
36.2	28.01	9	34.6	10	39.84	8	41.2	9	51.62	9	31.0	1	5.29	72	97.5	10
Sec *δ*, Tan *δ*	1.034		+0.263		1.012		+0.157		1.076		−0.397		3.843		+3.711	
Mean Place	25ˢ.557		13″.07		37ˢ.259		21″.32		48ˢ.568		41″.69		7ˢ.637		61″.30	
$D'_\psi a$, $D_\omega a$	0.00		−0.02		0.00		−0.01		+0.01		+0.03		−0.02		−0.24	
$D_\psi \delta$, $D_\omega \delta$	+0.4		−0.3		+0.4		−0.2		+0.4		−0.2		+0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ι Gruis. Mag. 4.1				59 Pegasi. Mag. 5.2				5 Cassiop. (*Heis*). Mag. 5.6				φ Aquarii. Mag. 4.4			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 5		−45 42		23 7		+ 8 14		23 9		+56 41		23 9		− 6 30	
	s		″		s		″		s		″		s		″	
Jan. 1.2	25.97		82.6		19.89		49.7		3.50		29.0		48.46		71.7	
11.2	25.83	14	81.6	10	19.81	8	48.8	9	3.25	25	27.6	14	48.38	8	72.2	5
21.1	25.72	11	80.2	14	19.74	7	47.9	9	3.02	23	25.7	19	48.32	6	72.6	4
31.1	25.65	7	78.5	17	19.70	4	47.0	9	2.83	19	23.4	23	48.28	4	72.8	2
Feb. 10.1	25.62	3	76.5	20	19.68	2	46.1	9	2.70	13	20.8	26	48.27	1	72.9	1
20.0	25.62	0	74.2	23	19.69	1	45.3	8	2.62	8	18.1	27	48.28	1	72.8	1
Mar. 2.0	25.67	5	71.6	26	19.73	4	44.7	6	2.61	1	15.3	28	48.32	4	72.5	3
12.0	25.76	9	68.8	28	19.80	7	44.3	4	2.67	6	12.6	27	48.39	7	72.0	5
22.0	25.90	14	66.0	28	19.91	11	44.1	2	2.80	13	10.1	25	48.50	11	71.3	7
31.9	26.08	18	63.1	29	20.05	14	44.2	1	3.01	21	7.9	22	48.64	14	70.3	10
Apr. 10.9	26.31	23	60.2	29	20.23	18	44.6	4	3.28	27	6.0	19	48.82	18	69.1	12
20.9	26.59	28	57.3	29	20.45	22	45.3	7	3.62	34	4.6	14	49.03	21	67.7	14
30.9	26.91	32	54.5	28	20.70	25	46.4	11	4.01	39	3.6	10	49.28	25	66.1	16
May 10.8	27.26	35	51.9	26	20.98	28	47.7	13	4.44	43	3.2	4	49.56	28	64.3	18
20.8	27.64	38	49.5	24	21.28	30	49.3	16	4.91	47	3.4	2	49.86	30	62.3	20
30.8	28.05	41	47.4	21	21.60	32	51.2	19	5.40	49	4.1	7	50.17	31	60.3	20
June 9.7	28.47	42	45.6	18	21.92	32	53.2	20	5.90	50	5.4	13	50.49	32	58.2	21
19.7	28.89	42	44.2	14	22.24	32	55.3	21	6.39	49	7.2	18	50.82	33	56.2	20
29.7	29.30	41	43.2	10	22.56	32	57.5	22	6.85	46	9.4	22	51.14	32	54.2	20
July 9.7	29.70	40	42.6	6	22.86	30	59.7	22	7.28	43	12.0	26	51.44	30	52.3	19
19.6	30.07	37	42.4	2	23.13	27	61.9	22	7.68	40	15.0	30	51.72	28	50.6	17
29.6	30.40	33	42.6	2	23.38	25	64.0	21	8.03	35	18.2	32	51.98	26	49.1	15
Aug. 8.6	30.69	29	43.3	7	23.59	21	66.0	20	8.32	29	21.6	34	52.20	22	47.9	12
18.6	30.92	23	44.4	11	23.77	18	67.8	18	8.55	23	25.1	35	52.38	18	46.9	10
28.5	31.09	17	45.8	14	23.90	13	69.4	16	8.71	16	28.7	36	52.52	14	46.1	8
Sept. 7.5	31.21	12	47.5	17	23.99	9	70.8	14	8.81	10	32.2	35	52.62	10	45.6	5
17.5	31.27	6	49.4	19	24.04	5	71.9	11	8.85	4	35.6	34	52.68	6	45.3	3
27.4	31.27	0	51.4	20	24.06	2	72.8	9	8.82	3	38.9	33	52.69	1	45.2	1
Oct. 7.4	31.21	6	53.4	20	24.04	2	73.5	7	8.74	8	42.0	31	52.67	2	45.4	2
17.4	31.11	10	55.4	20	23.99	5	74.0	5	8.60	14	44.8	28	52.63	4	45.8	4
27.4	30.97	14	57.2	18	23.92	7	74.2	2	8.42	18	47.2	24	52.56	7	46.2	4
Nov. 6.3	30.80	17	58.8	16	23.83	9	74.2	0	8.21	21	49.2	20	52.47	9	46.7	5
16.3	30.61	19	60.1	13	23.73	10	74.1	1	7.97	24	50.7	15	52.37	10	47.3	6
26.3	30.41	20	61.0	9	23.63	10	73.8	3	7.70	27	51.7	10	52.26	11	47.9	6
Dec. 6.3	30.21	20	61.6	6	23.52	11	73.3	5	7.42	28	52.2	5	52.16	10	48.6	7
16.2	30.02	19	61.7	1	23.41	11	72.7	6	7.13	29	52.2	0	52.06	10	49.2	6
26.2	29.85	17	61.4	3	23.31	10	71.9	8	6.85	28	51.6	6	51.97	9	49.8	6
36.2	29.69	16	60.6	8	23.23	8	71.1	8	6.58	27	50.5	11	51.88	9	50.3	5
Sec δ, Tan δ	1.432		−1.025		1.010		+0.145		+1.821		+1.522		1.007		−0.114	
Mean Place	$26^{s}.294$		$65''.50$		$20^{s}.609$		$51''.07$		$5^{s}.382$		$16''.57$		$49^{s}.021$		$65''.56$	
D′ψ α, Dω α	+0.01		+0.07		0.00		−0.01		−0.01		−0.10		0.00		+0.01	
Dψ δ, Dω δ	+0.4		−0.2		+0.4		−0.2		+0.4		−0.2		+0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ψ Aquarii. Mag. 4.5				γ Tucanæ. Mag. 4.1				γ Piscium. Mag. 3.8				γ Sculptoris. Mag. 4.5			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 23 11		° ′ − 9 33		h m 23 12		° ′ −58 42		h m 23 12		° ′ + 2 48		h m 23 14		° ′ −33 0	
	s		″		s		″		s		″		s		″	
Jan. 1.2	19.56	8	49.4	4	21.29	23	66.9	14	38.66	8	21.4	8	7.36	10	36.2	4
11.2	19.48	6	49.8	3	21.06	18	65.5	19	38.58	6	20.6	7	7.26	8	35.8	8
21.1	19.42	4	50.1	1	20.88	14	63.6	23	38.52	4	19.9	6	7.18	6	35.0	11
31.1	19.38	1	50.2	1	20.74	9	61.3	26	38.48	2	19.3	6	7.12	3	33.9	14
Feb. 10.1	19.37	1	50.1	3	20.65	3	58.7	29	38.46	1	18.7	5	7.09	0	32.5	16
20.1	19.38	4	49.8	5	20.62	2	55.8	31	38.47	3	18.2	3	7.09	4	30.9	19
Mar. 2.0	19.42	7	49.3	7	20.64	9	52.7	33	38.50	7	17.9	1	7.13	8	29.0	21
12.0	19.49	10	48.6	9	20.73	15	49.4	34	38.57	10	17.8	2	7.21	11	26.9	22
22.0	19.59	14	47.7	11	20.88	21	46.0	34	38.67	14	18.0	5	7.32	15	24.7	24
31.9	19.73	18	46.6	14	21.09	27	42.6	33	38.81	18	18.5	7	7.47	19	22.3	25
Apr. 10.9	19.91	22	45.2	16	21.36	33	39.3	32	38.99	21	19.2	10	7.66	24	19.8	25
20.9	20.13	25	43.6	17	21.69	39	36.1	30	39.20	25	20.2	12	7.90	27	17.3	26
30.9	20.38	27	41.9	19	22.08	44	33.1	28	39.45	28	21.4	15	8.17	30	14.7	25
May 10.8	20.65	30	40.0	20	22.52	47	30.3	25	39.73	30	22.9	17	8.47	33	12.2	24
20.8	20.95	32	38.0	21	22.99	50	27.8	21	40.03	31	24.6	19	8.80	35	9.8	22
30.8	21.27	33	35.9	21	23.49	52	25.7	17	40.34	32	26.5	21	9.15	37	7.6	20
June 9.8	21.60	33	33.8	20	24.01	53	24.0	12	40.66	33	28.6	21	9.52	37	5.6	17
19.7	21.93	32	31.8	20	24.54	52	22.8	7	40.99	32	30.7	22	9.89	36	3.9	15
29.7	22.25	31	29.8	18	25.06	50	22.1	2	41.31	30	32.9	21	10.25	35	2.4	11
July 9.7	22.56	29	28.0	16	25.56	47	21.9	2	41.61	28	35.0	20	10.60	33	1.3	7
19.6	22.85	26	26.4	14	26.03	42	22.1	7	41.89	25	37.0	19	10.93	30	0.6	3
29.6	23.11	22	25.0	11	26.45	36	22.8	12	42.14	22	38.9	17	11.23	25	0.3	0
Aug. 8.6	23.33	18	23.9	8	26.81	30	24.0	16	42.36	18	40.6	15	11.48	21	0.3	4
18.6	23.51	14	23.1	6	27.11	22	25.6	20	42.54	14	42.1	13	11.69	16	0.7	7
28.5	23.65	10	22.5	3	27.33	14	27.6	22	42.68	10	43.4	11	11.85	11	1.4	10
Sept. 7.5	23.75	6	22.2	1	27.47	7	29.8	24	42.78	6	44.5	8	11.96	7	2.4	13
17.5	23.81	2	22.1	1	27.54	1	32.2	25	42.84	2	45.3	6	12.03	2	3.7	14
27.5	23.83	1	22.2	3	27.53	9	34.7	25	42.86	1	45.9	4	12.05	2	5.1	15
Oct. 7.4	23.82	4	22.5	5	27.44	15	37.2	23	42.85	4	46.3	2	12.03	7	6.6	16
17.4	23.78	7	23.0	6	27.29	21	39.5	21	42.81	6	46.5	0	11.96	10	8.2	15
27.4	23.71	9	23.6	6	27.08	25	41.6	18	42.75	9	46.5	2	11.86	12	9.7	14
Nov. 6.3	23.62	10	24.2	7	26.83	28	43.4	14	42.66	10	46.3	3	11.74	13	11.1	12
16.3	23.52	11	24.9	7	26.55	30	44.8	10	42.56	10	46.0	5	11.61	14	12.3	10
26.3	23.41	11	25.6	7	26.25	31	45.8	5	42.46	10	45.5	5	11.47	15	13.3	7
Dec. 6.3	23.30	10	26.3	6	25.94	30	46.3	1	42.36	10	45.0	6	11.32	14	14.0	4
16.2	23.20	9	26.9	5	25.64	28	46.2	6	42.26	9	44.4	7	11.18	13	14.4	1
26.2	23.11	9	27.4	4	25.36	25	45.6	11	42.17	9	43.7	7	11.05	12	14.5	2
36.2	23.02		27.8		25.11		44.5		42.08		43.0		10.93		14.3	
Sec δ, Tan δ	1.014		−0.168		1.926		−1.645		1.001		+0.049		1.192		−0.650	
Mean Place	20ˢ.087		42″.35		21ˢ.473		47″.47		39ˢ.294		24″.38		7ˢ.705		22″.21	
D′ψ α, Dω α	0.00		+0.01		+0.01		+0.11		0.00		0.00		0.00		+0.04	
Dψ δ, Dω δ	+0.4		−0.2		+0.4		−0.2		+0.4		−0.2		+0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*o* Cephei. Mag. 4.9				τ Pegasi. Mag. 4.6				b^1 Aquarii. Mag. 4.2				4 Cassiopeiæ. Mag. 5.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 14		+67 37		23 16		+23 15		23 18		−20 34		23 20		+61 48	
	s		″		s		″		s		″		s		″	
Jan. 1.2	60.13		82.0		18.86		54.0		23.75		42.9		55.88		32.3	
11.2	59.69	44	80.7	13	18.75	11	52.9	11	23.66	9	42.9	0	55.55	33	31.1	12
21.1	59.29	40	78.9	18	18.66	9	51.5	14	23.59	7	42.7	2	55.25	30	29.3	18
31.1	58.96	33	76.7	22	18.59	7	50.0	15	23.54	5	42.3	4	55.00	25	27.1	22
Feb. 10.1	58.70	26	74.1	26	18.55	4	48.5	15	23.52	2	41.6	7	54.80	20	24.6	25
20.1	58.53	17	71.3	28	18.54	1	47.0	15	23.52	0	40.7	9	54.67	13	21.9	27
Mar. 2.0	58.45	8	68.3	30	18.56	2	45.5	15	23.55	3	39.6	11	54.61	6	19.0	29
12.0	58.48	3	65.3	30	18.62	6	44.2	13	23.61	6	38.2	14	54.63	2	16.1	29
22.0	58.62	14	62.5	28	18.72	10	43.2	10	23.71	10	36.6	16	54.74	11	13.4	27
31.9	58.86	24	59.9	26	18.86	14	42.5	7	23.85	14	34.8	18	54.94	20	11.0	24
Apr. 10.9	59.20	34	57.6	23	19.04	18	42.1	4	24.03	18	32.9	19	55.22	28	8.9	21
20.9	59.63	43	55.8	18	19.26	22	42.1	0	24.24	21	30.8	21	55.57	35	7.2	17
30.9	60.14	51	54.5	13	19.52	26	42.5	4	24.49	25	28.6	22	55.99	42	6.0	12
May 10.8	60.71	57	53.7	8	19.81	29	43.2	7	24.77	28	26.4	22	56.46	47	5.3	7
20.8	61.33	62	53.5	2	20.12	31	44.3	11	25.07	30	24.1	23	56.98	52	5.2	1
30.8	61.98	65	53.9	4	20.45	33	45.8	15	25.40	33	21.9	22	57.52	54	5.6	4
June 9.8	62.63	65	54.8	9	20.79	34	47.6	18	25.74	34	19.8	21	58.07	55	6.6	10
19.7	63.27	64	56.3	15	21.13	34	49.7	21	26.08	34	17.9	19	58.61	54	8.1	15
29.7	63.89	62	58.3	20	21.46	33	52.0	23	26.42	34	16.2	17	59.14	53	10.1	20
July 9.7	64.47	58	60.7	24	21.78	32	54.4	24	26.74	32	14.7	15	59.64	50	12.6	25
19.6	64.99	52	63.5	28	22.07	29	56.9	25	27.04	30	13.5	12	60.09	45	15.5	29
29.6	65.44	45	66.7	32	22.33	26	59.5	26	27.31	27	12.6	9	60.48	39	18.6	31
Aug. 8.6	65.81	37	70.1	34	22.55	22	62.1	26	27.55	24	12.0	6	60.81	33	22.0	34
18.6	66.10	29	73.7	36	22.73	18	64.6	25	27.75	20	11.7	3	61.08	27	25.5	35
28.5	66.30	20	77.4	37	22.87	14	67.0	24	27.90	15	11.7	0	61.28	20	29.1	36
Sept. 7.5	66.42	12	81.2	38	22.97	10	69.2	22	28.01	11	12.0	3	61.40	12	32.7	36
17.5	66.45	3	84.9	37	23.03	6	71.2	20	28.08	7	12.5	5	61.45	5	36.3	36
27.5	66.39	6	88.5	36	23.05	2	73.0	18	28.11	3	13.3	8	61.43	2	39.8	35
Oct. 7.4	66.25	14	91.9	34	23.03	2	74.5	15	28.10	1	14.2	9	61.34	9	43.1	33
17.4	66.03	22	95.1	32	22.98	5	75.8	13	28.05	5	15.2	10	61.19	15	46.1	30
27.4	65.74	29	97.9	28	22.91	7	76.8	10	27.98	7	16.3	11	60.98	21	48.8	27
Nov. 6.3	65.40	34	100.3	24	22.82	9	77.5	7	27.88	10	17.4	11	60.73	25	51.1	23
16.3	65.00	40	102.3	20	22.71	11	77.9	4	27.77	11	18.4	10	60.44	29	52.9	18
26.3	64.56	44	103.7	14	22.59	12	78.0	1	27.66	11	19.3	9	60.12	32	54.2	13
Dec. 6.3	64.10	46	104.5	8	22.47	12	77.8	2	27.54	12	20.0	7	59.78	34	55.0	8
16.2	63.63	47	104.7	2	22.35	12	77.3	5	27.43	11	20.6	6	59.42	36	55.2	2
26.2	63.16	47	104.4	3	22.23	12	76.5	8	27.32	11	21.0	4	59.06	36	54.8	4
36.2	62.70	46	103.5	9	22.12	11	75.5	10	27.22	10	21.1	1	58.72	34	53.9	9
Sec δ, Tan δ	2.628		+2.431		1.089		+0.430		1.068		−0.375		2.116		+1.865	
Mean Place	$62^{s}.863$		$67''.35$		$19^{s}.722$		$50''.17$		$24^{s}.149$		$32''.58$		$57^{s}.991$		$18''.21$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.01		−0.16		0.00		−0.03		0.00		+0.02		−0.01		−0.12	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.4		−0.2		+0.4		−0.2		+0.4		−0.2		+0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*υ* Pegasi. Mag. 4.6				*κ* Piscium. Mag. 4.9				*θ* Piscium. Mag. 4.4				70 Pegasi. Mag. 4.7			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 21		+22 55		23 22		+ 0 46		23 23		+ 5 53		23 24		+12 16	
	s		″		s		″		s		″		s		″	
Jan. 1.2	1.27	10	33.7	11	27.80	8	42.0	7	32.64	9	62.2	8	44.54	9	50.4	10
11.2	1.17	9	32.6	13	27.72	7	41.3	6	32.55	7	61.4	8	44.45	8	49.4	10
21.1	1.08	7	31.3	14	27.65	5	40.7	6	32.48	5	60.6	8	44.37	6	48.4	10
31.1	1.01	5	29.9	15	27.60	3	40.1	5	32.43	3	59.8	7	44.31	3	47.4	10
Feb. 10.1	0.96	2	28.4	15	27.57	0	39.6	3	32.40	0	59.1	6	44.28	1	46.4	10
20.1	0.94	2	26.9	14	27.57	2	39.3	1	32.40	2	58.5	5	44.27	2	45.4	8
Mar. 2.0	0.96	6	25.5	13	27.59	6	39.2	1	32.42	5	58.0	3	44.29	5	44.6	6
12.0	1.02	9	24.2	10	27.65	9	39.3	3	32.47	9	57.7	0	44.34	9	44.0	4
22.0	1.11	13	23.2	7	27.74	13	39.6	5	32.56	13	57.7	3	44.43	12	43.6	2
31.9	1.24	18	22.5	4	27.87	17	40.1	8	32.69	17	58.0	6	44.55	17	43.4	2
Apr. 10.9	1.42	22	22.1	0	28.04	20	40.9	11	32.86	20	58.6	8	44.72	21	43.6	5
20.9	1.64	25	22.1	4	28.24	24	42.0	13	33.06	24	59.4	11	44.93	24	44.1	8
30.9	1.89	29	22.5	7	28.48	27	43.3	16	33.30	27	60.5	14	45.17	27	44.9	12
May 10.8	2.18	31	23.2	11	28.75	29	44.9	18	33.57	29	61.9	16	45.44	30	46.1	15
20.8	2.49	33	24.3	14	29.04	31	46.7	19	33.86	31	63.5	18	45.74	31	47.6	17
30.8	2.82	34	25.7	18	29.35	32	48.6	20	34.17	32	65.3	20	46.05	32	49.3	19
June 9.8	3.16	34	27.5	21	29.67	32	50.6	21	34.49	32	67.3	21	46.37	33	51.2	21
19.7	3.50	33	29.6	23	29.99	32	52.7	21	34.81	32	69.4	22	46.70	32	53.3	22
29.7	3.83	32	31.9	24	30.31	31	54.8	21	35.13	31	71.6	22	47.02	31	55.5	23
July 9.7	4.15	29	34.3	25	30.62	29	56.9	20	35.44	29	73.8	21	47.33	29	57.8	23
19.6	4.44	26	36.8	26	30.91	26	58.9	18	35.73	26	75.9	20	47.62	26	60.1	22
29.6	4.70	23	39.4	25	31.17	22	60.7	16	35.99	22	77.9	18	47.88	23	62.3	21
Aug. 8.6	4.93	19	41.9	25	31.39	19	62.3	14	36.21	18	79.7	17	48.11	19	64.4	20
18.6	5.12	15	44.4	24	31.58	15	63.7	12	36.39	15	81.4	15	48.30	15	66.4	18
28.5	5.27	10	46.8	22	31.73	11	64.9	10	36.54	11	82.9	13	48.45	11	68.2	16
Sept. 7.5	5.37	6	49.0	20	31.84	6	65.9	7	36.65	7	84.2	10	48.56	7	69.8	14
17.5	5.43	3	51.0	18	31.90	3	66.6	5	36.72	3	85.2	8	48.63	3	71.2	12
27.5	5.46	1	52.8	15	31.93	0	67.1	3	36.75	0	86.0	6	48.66	1	72.4	10
Oct. 7.4	5.45	4	54.3	13	31.93	3	67.4	1	36.75	3	86.6	3	48.65	3	73.4	7
17.4	5.41	7	55.6	10	31.90	6	67.5	1	36.72	6	86.9	1	48.62	6	74.1	5
27.4	5.34	9	56.6	7	31.84	8	67.4	3	36.66	8	87.0	0	48.56	8	74.6	2
Nov. 6.3	5.25	11	57.3	4	31.76	9	67.1	4	36.58	9	87.0	2	48.48	9	74.8	0
16.3	5.14	11	57.7	1	31.67	10	66.7	5	36.49	10	86.8	4	48.39	10	74.8	2
26.3	5.03	12	57.8	2	31.57	10	66.2	6	36.39	10	86.4	5	48.29	11	74.6	4
Dec. 6.3	4.91	12	57.6	5	31.47	10	65.6	6	36.29	10	85.9	6	48.18	11	74.2	5
16.2	4.79	12	57.1	7	31.37	10	65.0	6	36.19	10	85.3	7	48.07	10	73.7	7
26.2	4.67	11	56.4	10	31.27	9	64.4	7	36.09	9	84.6	7	47.97	9	73.0	9
36.2	4.56		55.4		31.18		63.7		36.00		83.9		47.88		72.1	
Sec δ, Tan δ	1.086		+0.423		1.000		+0.014		1.005		+0.103		1.023		+0.218	
Mean Place	$2^s.105$		29″.78		$28^s.358$		45″.32		$33^s.250$		63″.73		$45^s.210$		49″.72	
$D'_\psi\alpha$, $D_\omega\alpha$	0.00		−0.03		0.00		0.00		0.00		−0.01		0.00		−0.01	
$D_\psi\delta$, $D_\omega\delta$	+0.4		−0.2		+0.4		−0.2		+0.4		−0.2		+0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**β Sculptoris.** Mag. 4.5				**72 Pegasi** (*mean*). Mag. 5.2				**λ Andromedæ.** Mag. 4.0				**ι Andromedæ.** Mag. 4.3			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 28		−38 17		23 29		+30 50		23 33		+45 59		23 33		+42 47	
	s		″		s		″		s		″		s		″	
Jan. 1.2	18.36	12	73.9	5	37.13	13	49.3	12	16.87	19	23.6	12	50.78	17	21.4	12
11.2	18.24	11	73.4	9	37.00	11	48.1	14	16.68	17	22.4	16	50.61	16	20.2	15
21.1	18.13	8	72.5	13	36.89	9	46.7	16	16.51	15	20.8	19	50.45	13	18.7	18
31.1	18.05	5	71.2	16	36.80	7	45.1	17	16.36	11	18.9	22	50.32	10	16.9	21
Feb. 10.1	18.00	2	69.6	19	36.73	3	43.4	18	16.25	7	16.7	23	50.22	7	14.8	22
20.1	17.98	1	67.7	21	36.70	0	41.6	18	16.18	3	14.4	24	50.15	2	12.6	23
Mar. 2.0	17.99	5	65.6	24	36.70	4	39.8	17	16.15	3	12.0	23	50.13	3	10.3	22
12.0	18.04	10	63.2	25	36.74	8	38.1	15	16.18	8	9.7	22	50.16	8	8.1	20
22.0	18.14	14	60.7	27	36.82	13	36.6	12	16.26	14	7.5	20	50.24	13	6.1	18
Apr. 1.0	18.28	18	58.0	28	36.95	18	35.4	8	16.40	20	5.5	16	50.37	19	4.3	15
10.9	18.46	23	55.2	28	37.13	22	34.6	4	16.60	25	3.9	12	50.56	24	2.8	10
20.9	18.69	27	52.4	28	37.35	26	34.2	1	16.85	30	2.7	7	50.80	29	1.8	6
30.9	18.96	31	49.6	27	37.61	30	34.1	4	17.15	34	2.0	2	51.09	33	1.2	1
May 10.8	19.27	34	46.9	25	37.91	32	34.5	8	17.49	38	1.8	3	51.42	36	1.1	4
20.8	19.61	36	44.4	23	38.23	34	35.3	12	17.87	40	2.1	7	51.78	38	1.5	8
30.8	19.97	38	42.1	21	38.57	36	36.5	16	18.27	41	2.8	12	52.16	40	2.3	13
June 9.8	20.35	38	40.0	18	38.93	36	38.1	20	18.68	42	4.0	17	52.56	40	3.6	18
19.7	20.73	38	38.2	14	39.29	35	40.1	22	19.10	40	5.7	21	52.96	39	5.4	21
29.7	21.11	37	36.8	11	39.64	33	42.3	25	19.50	38	7.8	24	53.35	37	7.5	24
July 9.7	21.48	35	35.7	7	39.97	31	44.8	26	19.88	36	10.2	27	53.72	34	9.9	27
19.7	21.83	32	35.0	2	40.28	28	47.4	27	20.24	32	12.9	29	54.06	31	12.6	29
29.6	22.15	28	34.8	2	40.56	24	50.1	28	20.56	28	15.8	31	54.37	27	15.5	31
Aug. 8.6	22.43	24	35.0	6	40.80	20	52.9	27	20.84	23	18.9	32	54.64	22	18.6	31
18.6	22.67	19	35.6	10	41.00	16	55.6	27	21.07	18	22.1	32	54.86	18	21.7	31
28.5	22.86	13	36.6	13	41.16	12	58.3	26	21.25	13	25.3	32	55.04	13	24.8	31
Sept. 7.5	22.99	8	37.9	15	41.28	7	60.9	24	21.38	8	28.5	31	55.17	8	27.9	30
17.5	23.07	3	39.4	17	41.35	3	63.3	22	21.46	2	31.6	29	55.25	3	30.9	28
27.5	23.10	1	41.1	18	41.38	1	65.5	20	21.48	2	34.5	27	55.28	2	33.7	25
Oct. 7.4	23.09	6	42.9	18	41.37	4	67.5	17	21.46	6	37.2	25	55.26	5	36.2	23
17.4	23 03	10	44.7	18	41.33	7	69.2	14	21.40	9	39.7	21	55.21	9	38.5	20
27.4	22.93	12	46.5	16	41.26	9	70.6	11	21.31	13	41.8	18	55.12	12	40.5	17
Nov. 6.4	22.81	14	48.1	14	41.17	11	71.7	8	21.18	16	43.6	14	55.00	14	42.2	13
16.3	22.67	16	49.5	11	41.06	13	72.5	4	21.02	18	45.0	9	54.86	16	43.5	8
26.3	22.51	17	50.6	8	40.93	13	72.9	1	20.84	19	45.9	4	54.70	17	44.3	4
Dec. 6.3	22.34	16	51.4	5	40.80	14	73.0	3	20.65	20	46.3	0	54.53	18	44.7	1
16.2	22.18	15	51.9	1	40.66	14	72.7	7	20.45	20	46.3	5	54.35	19	44.6	5
26.2	22.03	14	52.0	3	40.52	13	72.0	10	20.25	19	45.8	9	54.16	18	44.1	9
36.2	21.89		51.7		40.39		71.0		20.06		44.9		53.98		43.2	
Sec δ, Tan δ	1.274		−0.790		1.165		+0.597		1.439		+1.035		1.363		+0.926	
Mean Place	$18^{s}.557$		$58''.85$		$38^{s}.045$		$42''.42$		$18^{s}.116$		$12''.25$		$51^{s}.928$		$10''.90$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	0.00		+0.05		0.00		−0.04		0.00		−0.07		0.00		−0.06	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.4		−0.1		+0.4		−0.1		+0.4		−0.1		+0.4		−0.1	

Mean Solar Date.	ι Piscium. Mag. 4.3				γ Cephei. Mag. 3.4				κ Andromedæ. Mag. 4.3				ω^2 Aquarii. Mag. 4.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 35		+ 5 9		23 35		+77 8		23 36		+43 50		23 38		−15 1	
	s		″		s		″		s		″		s		″	
Jan. 1.2	27.96		15.5		41.85		65.7		5.99		78.4		12.37		41.4	
		9		8		86		9		18		12		10		2
11.2	27.87		14.7		40.99		64.8		5.81		77.2		12.27		41.6	
		8		8		80		14		16		15		8		1
21.1	27.79		13.9		40.19		63.4		5.65		75.7		12.19		41.7	
		6		7		70		19		14		18		6		1
31.1	27.73		13.2		39.49		61.5		5.51		73.9		12.13		41.6	
		4		7		58		24		11		21		4		4
Feb. 10.1	27.69		12.5		38.91		59.1		5.40		71.8		12.09		41.2	
		2		6		44		28		7		23		2		6
20.1	27.67		11.9		38.47		56.3		5.33		69.5		12.07		40.6	
		1		4		27		30		3		23		1		8
Mar. 2.0	27.68		11.5		38.20		53.3		5.30		67.2		12.08		39.8	
		5		2		9		30		2		22		5		10
12.0	27.73		11.3		38.11		50.3		5.32		65.0		12.13		38.8	
		8		0		10		30		8		21		8		13
22.0	27.81		11.3		38.21		47.3		5.40		62.9		12.21		37.5	
		12		3		28		29		14		18		12		15
Apr. 1.0	27.93		11.6		38.49		44.4		5.54		61.1		12.33		36.0	
		16		6		46		26		19		15		15		17
10.9	28.09		12.2		38.95		41.8		5.73		59.6		12.48		34.3	
		19		9		62		22		24		11		19		19
20.9	28.28		13.1		39.57		39.6		5.97		58.5		12.67		32.4	
		23		11		76		18		29		7		23		20
30.9	28.51		14.2		40.33		37.8		6.26		57.8		12.90		30.4	
		26		14		87		13		33		2		26		21
May 10.8	28.77		15.6		41.20		36.5		6.59		57.6		13.16		28.3	
		29		16		96		7		36		3		29		22
20.8	29.06		17.2		42.16		35.8		6.95		57.9		13.45		26.1	
		31		18		102		1		39		8		31		22
30.8	29.37		19.0		43.18		35.7		7.34		58.7		13.76		23.9	
		32		20		104		4		40		13		33		22
June 9.8	29.69		21.0		44.22		36.1		7.74		60.0		14.09		21.7	
		32		21		104		10		40		17		33		21
19.7	30.01		23.1		45.26		37.1		8.14		61.7		14.42		19.6	
		32		21		101		16		40		21		33		19
29.7	30.33		25.2		46.27		38.7		8.54		63.8		14.75		17.7	
		31		21		95		21		38		24		32		17
July 9.7	30.64		27.3		47.22		40.8		8.92		66.2		15.07		16.0	
		29		21		87		25		35		27		30		15
19.7	30.93		29.4		48.09		43.3		9.27		68.9		15.37		14.5	
		27		20		77		29		32		29		28		13
29.6	31.20		31.4		48.86		46.2		9.59		71.8		15.65		13.2	
		24		18		65		33		27		31		25		10
Aug. 8.6	31.44		33.2		49.51		49.5		9.86		74.9		15.90		12.2	
		20		17		53		35		23		31		21		6
18.6	31.64		34.9		50.04		53.0		10.09		78.0		16.11		11.6	
		16		14		39		37		18		32		17		3
28.5	31.80		36.3		50.43		56.7		10.27		81.2		16.28		11.3	
		12		12		24		38		13		31		13		1
Sept. 7.5	31.92		37.5		50.67		60.5		10.40		84.3		16.41		11.2	
		8		10		10		39		8		30		8		2
17.5	32.00		38.5		50.77		64.4		10.48		87.3		16.49		11.4	
		4		7		5		38		3		28		5		5
27.5	32.04		39.2		50.72		68.2		10.51		90.1		16.54		11.9	
		1		5		19		37		1		26		1		7
Oct. 7.4	32.05		39.7		50.53		71.9		10.50		92.7		16.55		12.6	
		2		3		33		35		5		24		3		8
17.4	32.03		40.0		50.20		75.4		10.45		95.1		16.52		13.4	
		4		1		45		32		9		21		5		9
27.4	31.99		40.1		49.75		78.6		10.36		97.2		16.47		14.3	
		7		1		57		29		12		17		7		9
Nov. 6.4	31.92		40.0		49.18		81.5		10.24		98.9		16.40		15.2	
		8		2		68		24		14		13		9		9
16.3	31.84		39.8		48.50		83.9		10.10		100.2		16.31		16.1	
		9		4		77		20		16		9		10		9
26.3	31.75		39.4		47.73		85.9		9.94		101.1		16.21		17.0	
		10		5		83		14		18		5		11		8
Dec. 6.3	31.65		38.9		46.90		87.3		9.76		101.6		16.10		17.8	
		11		6		87		8		19		0		11		7
16.2	31.54		38.3		46.03		88.1		9.57		101.6		15.99		18.5	
		10		7		89		1		19		5		10		5
26.2	31.44		37.6		45.14		88.2		9.38		101.1		15.89		19.0	
		9		7		88		5		18		9		10		4
36.2	31.35		36.9		44.26		87.7		9.20		100.2		15.79		19.4	
Sec δ, Tan δ	1.004		+0.090		4.497		+4.384		1.387		+0.961		1.035		−0.268	
Mean Place	$28^s.488$		$16''.79$		$46^s.103$		$48''.46$		$7^s.144$		$67''.48$		$12^s.692$		$33''.33$	
$D'_\psi \alpha$, $D_\omega \alpha$	0.00		−0.01		−0.01		−0.29		0.00		−0.06		0.00		+0.02	
$D_\psi \delta$, $D_\omega \delta$	+0.4		−0.1		+0.4		−0.1		+0.4		−0.1		+0.4		−0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ι^1 Aquarii.** Mag. 5.3				**ψ Andromedæ.** Mag. 5.1				**41 H. Cephei.** Mag. 5.0				**δ Sculptoris.** Mag. 4.6			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 39		−18 45		23 41		+45 56		23 43		+67 19		23 44		−28 36	
	s		″		s		″		s		″		s		″	
Jan. 1.2	41.15	9	45.0	1	41.94	19	25.5	11	42.27	45	40.3	9	23.56	11	54.4	1
11.2	41.06	8	45.1	1	41.75	18	24.4	15	41.82	42	39.4	14	23.45	10	54.3	4
21.2	40.98	7	45.0	3	41.57	16	22.9	18	41.40	37	38.0	19	23.35	8	53.9	7
31.1	40.91	5	44.7	6	41.41	12	21.1	21	41.03	31	36.1	23	23.27	6	53.2	11
Feb. 10.1	40.86	2	44.1	8	41.29	8	19.0	23	40.72	23	33.8	27	23.21	3	52.1	14
20.1	40.84	1	43.3	10	41.21	4	16.7	24	40.49	14	31.1	29	23.18	0	50.7	16
Mar. 2.0	40.85	4	42.3	12	41.17	2	14.3	23	40.35	4	28.2	29	23.18	4	49.1	18
12.0	40.89	8	41.1	15	41.19	7	12.0	22	40.31	7	25.3	29	23.22	7	47.3	20
22.0	40.97	12	39.6	17	41.26	13	9.8	19	40.38	17	22.4	27	23.29	11	45.3	22
Apr. 1.0	41.09	16	37.9	19	41.39	19	7.9	16	40.55	28	19.7	24	23.40	16	43.1	24
10.9	41.25	19	36.0	21	41.58	24	6.3	12	40.83	38	17.3	20	23.56	20	40.7	25
20.9	41.44	23	33.9	22	41.82	29	5.1	8	41.21	46	15.3	16	23.76	23	38.2	26
30.9	41.67	26	31.7	22	42.11	33	4.3	3	41.67	53	13.7	11	23.99	27	35.6	26
May 10.9	41.93	29	29.5	23	42.44	37	4.0	2	42.20	59	12.6	5	24.26	30	33.0	25
20.8	42.22	31	27.2	22	42.81	40	4.2	7	42.79	63	12.1	0	24.56	33	30.5	24
30.8	42.53	33	25.0	22	43.21	41	4.9	11	43.42	65	12.1	6	24.89	35	28.1	22
June 9.8	42.86	34	22.8	21	43.62	41	6.0	16	44.07	65	12.7	11	25.24	35	25.9	20
19.7	43.20	33	20.7	19	44.03	41	7.6	20	44.72	64	13.8	17	25.59	35	23.9	17
29.7	43.53	33	18.8	16	44.44	39	9.6	24	45.36	61	15.5	21	25.94	35	22.2	15
July 9.7	43.86	31	17.2	14	44.83	36	12.0	27	45.97	56	17.6	26	26.29	33	20.7	11
19.7	44.17	28	15.8	11	45.19	33	14.7	29	46.53	51	20.2	30	26.62	30	19.6	7
29.6	44.45	25	14.7	8	45.52	29	17.6	31	47.04	44	23.2	32	26.92	27	18.9	3
Aug. 8.6	44.70	21	13.9	5	45.81	24	20.7	31	47.48	36	26.4	34	27.19	23	18.6	0
18.6	44.91	18	13.4	1	46.05	19	23.8	32	47.84	28	29.8	36	27.42	19	18.6	4
28.6	45.09	13	13.3	2	46.24	14	27.0	32	48.12	20	33.4	37	27.61	14	19.0	7
Sept. 7.5	45.22	9	13.5	4	46.38	9	30.2	31	48.32	11	37.1	37	27.75	10	19.7	10
17.5	45.31	5	13.9	6	46.47	4	33.3	29	48.43	2	40.8	37	27.85	5	20.7	12
27.5	45.36	1	14.5	9	46.51	0	36.2	27	48.45	6	44.5	35	27.90	1	21.9	14
Oct. 7.4	45.37	2	15.4	10	46.51	5	38.9	25	48.39	13	48.0	33	27.91	3	23.3	15
17.4	45.35	6	16.4	10	46.46	8	41.4	22	48.26	21	51.3	30	27.88	6	24.8	15
27.4	45.29	8	17.4	11	46.38	12	43.6	18	48.05	28	54.3	27	27.82	9	26.3	14
Nov. 6.4	45.21	9	18.5	11	46.26	15	45.4	15	47.77	33	57.0	22	27.73	11	27.7	13
16.3	45.12	11	19.6	10	46.11	17	46.9	10	47.44	38	59.2	17	27.62	12	29.0	12
26.3	45.01	11	20.6	8	45.94	18	47.9	6	47.06	42	60.9	12	27.50	13	30.2	9
Dec. 6.3	44.90	11	21.4	7	45.76	19	48.5	1	46.64	45	62.1	7	27.37	13	31.1	7
16.3	44.79	11	22.1	5	45.57	20	48.6	4	46.19	46	62.8	1	27.24	13	31.8	4
26.2	44.68	10	22.6	3	45.37	20	48.2	9	45.73	45	62.9	6	27.11	12	32.2	1
36.2	44.58		22.9		45.17		47.3		45.28		62.3		26.99		32.3	
Sec δ, Tan δ	1.056		−0.340		1.438		+1.033		2.594		+2.394		1.139		−0.545	
Mean Place	$41^{s}.439$		35″.77		$43^{s}.112$		13″.69		$44^{s}.573$		23″.95		$23^{s}.729$		42″.35	
$D'_\psi\alpha$, $D_\omega\alpha$	0.00		+0.02		0.00		−0.07		0.00		−0.16		0.00		+0.04	
$D_\psi\delta$, $D_\omega\delta$	+0.4		−0.1		+0.4		−0.1		+0.4		−0.1		+0.4		−0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ¹ Octantis. Mag. 5.1				φ Pegasi. Mag. 5.2				ρ Cassiopeiæ. Mag. 4.8				Groombridge 4163. Mag. 6.6			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 46		−82 29		23 48		+18 38		23 49		+57 0		23 50		+73 55	
	s		″		s		″		s		″		s		″	
Jan. 1.2	63.75		89.5		2.97		17.3		60.27		70.2		31.83		51.8	
11.2	62.34	141	87.7	18	2.87	10	16.4	9	59.99	28	69.3	9	31.15	68	51.1	7
21.2	61.08	126	85.4	23	2.77	10	15.3	11	59.72	27	67.9	14	30.51	64	49.8	13
31.1	60.00	108	82.6	28	2.69	8	14.1	12	59.48	24	66.0	19	29.94	57	48.0	18
Feb. 10.1	59.13	87	79.4	32	2.63	6	12.9	12	59.29	19	63.8	22	29.46	48	45.8	22
20.1	58.48	65	75.9	35	2.59	4	11.7	12	59.15	14	61.3	25	29.09	37	43.2	26
Mar. 2.0	58.07	41	72.2	37	2.58	1	10.6	11	59.07	8	58.7	26	28.84	25	40.3	29
12.0	57.91	16	68.3	39	2.61	3	9.6	10	59.05	2	56.0	27	28.74	10	37.3	30
22.0	58.01	10	64.4	39	2.67	6	8.8	8	59.10	5	53.4	26	28.78	4	34.3	30
Apr. 1.0	58.36	35	60.5	39	2.77	10	8.3	5	59.23	13	51.0	24	28.98	20	31.4	29
10.9	58.95	59	56.7	38	2.92	15	8.1	2	59.44	21	48.9	21	29.32	34	28.8	26
20.9	59.77	82	53.1	36	3.11	19	8.2	1	59.72	28	47.2	17	29.79	47	26.5	23
30.9	60.81	104	49.8	33	3.34	23	8.7	5	60.06	34	45.9	13	30.38	59	24.7	18
May 10.9	62.05	124	46.8	30	3.61	27	9.5	8	60.46	40	45.1	8	31.07	69	23.4	13
20.8	63.46	141	44.2	26	3.90	29	10.6	11	60.90	44	44.8	3	31.85	78	22.6	8
30.8	65.00	154	42.0	22	4.21	31	12.0	14	61.37	47	45.1	3	32.68	83	22.3	3
June 9.8	66.64	164	40.3	17	4.54	33	13.7	17	61.86	49	45.9	8	33.54	86	22.6	3
19.7	68.35	171	39.2	11	4.88	34	15.7	20	62.36	50	47.2	13	34.41	87	23.5	9
29.7	70.08	173	38.6	6	5.21	33	17.9	22	62.85	49	49.0	18	35.26	85	25.0	15
July 9.7	71.78	170	38.6	0	5.53	32	20.2	23	63.32	47	51.2	22	36.07	81	26.9	19
19.7	73.40	162	39.2	6	5.84	31	22.5	23	63.76	44	53.8	26	36.83	76	29.3	24
29.6	74.90	150	40.3	11	6.12	28	24.9	24	64.16	40	56.7	29	37.51	68	32.1	28
Aug. 8.6	76.23	133	41.9	16	6.37	25	27.2	23	64.51	35	59.8	31	38.10	59	35.3	32
18.6	77.35	112	44.0	21	6.58	21	29.5	23	64.81	30	63.1	33	38.59	49	38.7	34
28.6	78.22	87	46.5	25	6.75	17	31.6	21	65.05	24	66.6	35	38.97	38	42.3	36
Sept. 7.5	78.82	60	49.2	27	6.88	13	33.6	20	65.22	17	70.1	35	39.24	27	46.1	38
17.5	79.12	30	52.1	29	6.97	9	35.4	18	65.33	11	73.5	34	39.40	16	49.9	38
27.5	79.11	1	55.1	30	7.03	6	36.9	15	65.38	5	76.8	33	39.44	4	53.7	38
Oct. 7.4	78.79	32	58.1	30	7.05	2	38.2	13	65.37	1	80.0	32	39.36	8	57.4	37
17.4	78.17	62	60.9	28	7.04	1	39.3	11	65.31	6	83.0	30	39.17	19	60.9	35
27.4	77.28	89	63.4	25	7.00	4	40.2	9	65.19	12	85.7	27	38.87	30	64.1	32
Nov. 6.4	76.15	113	65.6	22	6.94	6	40.8	6	65.03	16	88.0	23	38.47	40	67.0	29
16.3	74.83	132	67.3	17	6.86	8	41.1	3	64.83	20	90.0	20	37.99	48	69.5	25
26.3	73.37	146	68.4	11	6.76	10	41.2	1	64.60	23	91.5	15	37.43	56	71.5	20
Dec. 6.3	71.82	155	68.9	5	6.65	11	41.0	2	64.34	26	92.5	10	36.81	62	73.0	15
16.3	70.23	159	68.8	1	6.54	11	40.6	4	64.06	28	92.9	4	36.15	66	73.9	9
26.2	68.67	156	68.0	8	6.43	11	40.0	6	63.77	29	92.8	1	35.47	68	74.2	3
36.2	67.18	149	66.6	14	6.32	11	39.2	8	63.49	28	92.2	6	34.79	68	73.9	3
Sec δ, Tan δ	7.663		−7.597		1.055		+0.337		1.837		+1.541		3.612		+3.471	
Mean Place	61ˢ.961		68″.43		3ˢ.588		13″.48		61ˢ.785		55″.37		34ˢ.945		34″.13	
D′ψ α, Dω α	+0.01		+0.51		0.00		−0.02		0.00		−0.10		0.00		−0.23	
Dψ δ, Dω δ	+0.4		−0.1		+0.4		−0.1		+0.4		0.0		+0.4		0.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ω Piscium.** Mag. 4.0				**ε Tucanæ.** Mag. 4.7				**30 Piscium.** Mag. 4.7				**2 Ceti.** Mag. 4.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 23 54		° ′ + 6 22		h m 23 55		° ′ −66 3		h m 23 57		° ′ − 6 29		h m 23 59		° ′ −17 48	
	s		″		s		″		s		″		s		″	
Jan. 1.2	50.15	10	54.0	7	24.71	38	58.9	12	29.61	9	55.8	5	16.86	10	81.6	3
11.2	50.05	9	53.3	8	24.33	35	57.7	17	29.52	8	56.3	4	16.76	9	81.9	0
21.2	49.96	7	52.5	7	23.98	30	56.0	22	29.44	7	56.7	2	16.67	8	81.9	2
31.1	49.89	6	51.8	7	23.68	24	53.8	26	29.37	6	56.9	1	16.59	6	81.7	5
Feb. 10.1	49.83	3	51.1	6	23.44	17	51.2	30	29.31	4	57.0	1	16.53	4	81.2	7
20.1	49.80	1	50.5	4	23.27	10	48.2	33	29.27	1	56.9	3	16.49	1	80.5	10
Mar. 2.1	49.79	2	50.1	3	23.17	3	44.9	35	29.26	2	56.6	5	16.48	2	79.5	12
12.0	49.81	6	49.8	0	23.14	5	41.4	36	29.28	6	56.1	8	16.50	6	78.3	14
22.0	49.87	10	49.8	2	23.19	13	37.8	37	29.34	10	55.3	10	16.56	9	76.9	16
Apr. 1.0	49.97	14	50.0	5	23.32	22	34.1	37	29.44	13	54.3	12	16.65	13	75.3	19
10.9	50.11	17	50.5	8	23.54	30	30.4	36	29.57	17	53.1	15	16.78	17	73.4	21
20.9	50.28	22	51.3	10	23.84	37	26.8	34	29.74	21	51.6	17	16.95	21	71.3	22
30.9	50.50	25	52.3	13	24.21	45	23.4	32	29.95	24	49.9	18	17.16	25	69.1	22
May 10.9	50.75	28	53.6	16	24.66	51	20.2	28	30.19	28	48.1	20	17.41	28	66.9	23
20.8	51.03	30	55.2	18	25.17	56	17.4	25	30.47	30	46.1	21	17.69	30	64.6	23
30.8	51.33	32	57.0	19	25.73	60	14.9	21	30.77	32	44.0	21	17.99	32	62.3	23
June 9.8	51.65	32	58.9	20	26.33	62	12.8	16	31.09	32	41.9	21	18.31	33	60.0	22
19.8	51.97	32	60.9	21	26.95	63	11.2	11	31.41	32	39.8	21	18.64	34	57.8	20
29.7	52.29	32	63.0	22	27.58	62	10.1	5	31.73	32	37.7	20	18.98	33	55.8	17
July 9.7	52.61	30	65.2	21	28.20	60	9.6	0	32.05	31	35.7	18	19.31	32	54.1	15
19.7	52.91	28	67.3	20	28.80	56	9.6	5	32.36	28	33.9	16	19.63	29	52.6	12
29.6	53.19	25	69.3	19	29.36	50	10.1	11	32.64	25	32.3	14	19.92	26	51.4	9
Aug. 8.6	53.44	21	71.2	17	29.86	43	11.2	16	32.89	22	30.9	11	20.18	23	50.5	6
18.6	53.65	18	72.9	15	30.29	35	12.8	20	33.11	18	29.8	8	20.41	19	49.9	3
28.6	53.83	14	74.4	13	30.64	26	14.8	23	33.29	14	29.0	6	20.60	15	49.6	1
Sept. 7.5	53.97	10	75.7	11	30.90	16	17.1	26	33.43	11	28.4	3	20.75	11	49.7	4
17.5	54.07	6	76.8	8	31.06	6	19.7	27	33.54	7	28.1	1	20.86	7	50.1	6
27.5	54.13	3	77.6	6	31.12	4	22.4	28	33.61	3	28.0	2	20.93	3	50.7	8
Oct. 7.5	54.16	0	78.2	4	31.08	13	25.2	27	33.64	1	28.2	4	20.96	1	51.5	10
17.4	54.16	3	78.6	2	30.95	21	27.9	26	33.63	3	28.6	5	20.95	4	52.5	11
27.4	54.13	5	78.8	0	30.74	29	30.5	23	33.60	5	29.1	6	20.91	6	53.6	11
Nov. 6.4	54.08	7	78.8	2	30.45	35	32.8	19	33.55	7	29.7	7	20.85	8	54.7	11
16.3	54.01	9	78.6	3	30.10	39	34.7	14	33.48	9	30.4	7	20.77	9	55.8	10
26.3	53.92	9	78.3	4	29.71	42	36.1	9	33.39	9	31.1	8	20.68	10	56.8	9
Dec. 6.3	53.83	10	77.9	6	29.29	43	37.0	3	33.30	10	31.9	7	20.58	11	57.7	8
16.3	53.73	10	77.3	7	28.86	42	37.3	2	33.20	10	32.6	6	20.47	12	58.5	6
26.2	53.63	10	76.6	7	28.44	40	37.1	8	33.10	10	33.2	5	20.35	11	59.1	4
36.2	53.53		75.9		28.04		36.3		33.00		33.7		20.24		59.5	
Sec δ, Tan δ	1.006		+0.112		2.464		−2.252		1.006		−0.114		1.050		−0.321	
Mean Place	50ˢ.579		54″.19		24ˢ.185		39″.16		29ˢ.905		51″.23		17ˢ.038		73″.35	
D′ψ α, Dω α	0.00		−0.01		0.00		+0.15		0.00		+0.01		0.00		+0.02	
Dψ δ, Dω δ	+0.4		0.0		+0.4		0.0		+0.4		0.0		+0.4		0.0	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**81 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Jan.	1 42	−85 12	Jan.	5 47	−84 49	Jan.	7 17	−86 53	Jan.	9 9	−85 18	Jan.	10 59	−84 7
	s	″		s	″		s	″		s	″		s	″
0.3	28.39	50.53	0.5	17.06	47.93	0.5	63.17	28.48	0.6	38.75	39.94	0.7	56.87	11.88
1.3	28.09	50.59	1.5	16.96	48.30	1.5	63.17	28.88	1.6	38.91	40.29	1.7	57.08	12.11
2.3	27.79	50.63	2.5	16.84	48.68	2.5	63.15	29.28	2.6	39.05	40.66	2.7	57.31	12.37
3.3	27.48	50.64	3.5	16.70	49.05	3.5	63.11	29.69	3.6	39.17	41.04	3.7	57.53	12.65
4.3	27.18	50.62	4.5	16.55	49.40	4.5	63.04	30.09	4.6	39.27	41.43	4.7	57.72	12.95
5.3	26.88	50.59	5.4	16.40	49.72	5.5	62.94	30.46	5.6	39.36	41.81	5.7	57.90	13.24
6.3	26.61	50.55	6.4	16.25	50.01	6.5	62.84	30.82	6.6	39.44	42.18	6.7	58.06	13.53
7.3	26.35	50.49	7.4	16.10	50.29	7.5	62.73	31.16	7.6	39.51	42.53	7.7	58.21	13.82
8.3	26.10	50.43	8.4	15.96	50.55	8.5	62.62	31.49	8.6	39.57	42.86	8.7	58.35	14.09
9.3	25.85	50.39	9.4	15.82	50.81	9.5	62.51	31.80	9.6	39.63	43.19	9.7	58.49	14.35
10.3	25.61	50.35	10.4	15.69	51.07	10.5	62.42	32.10	10.6	39.70	43.51	10.7	58.64	14.60
11.3	25.37	50.31	11.4	15.56	51.34	11.5	62.35	32.41	11.6	39.78	43.82	11.6	58.79	14.85
12.3	25.13	50.28	12.4	15.43	51.62	12.5	62.28	32.74	12.6	39.87	44.14	12.6	58.95	15.10
13.3	24.87	50.26	13.4	15.30	51.91	13.5	62.21	33.08	13.6	39.96	44.48	13.6	59.12	15.36
14.3	24.60	50.25	14.4	15.17	52.22	14.5	62.14	33.44	14.6	40.05	44.83	14.6	59.29	15.63
15.3	24.31	50.23	15.4	15.02	52.54	15.5	62.05	33.82	15.6	40.14	45.21	15.6	59.47	15.91
16.2	24.02	50.19	16.4	14.85	52.87	16.5	61.95	34.21	16.6	40.23	45.61	16.6	59.65	16.22
17.2	23.71	50.13	17.4	14.67	53.19	17.5	61.80	34.61	17.6	40.30	46.02	17.6	59.82	16.56
18.2	23.40	50.03	18.4	14.47	53.50	18.5	61.61	35.01	18.6	40.34	46.44	18.6	59.98	16.93
19.2	23.10	49.91	19.4	14.25	53.79	19.5	61.41	35.39	19.6	40.36	46.87	19.6	60.12	17.30
20.2	22.81	49.76	20.4	14.02	54.04	20.5	61.17	35.74	20.5	40.36	47.28	20.6	60.25	17.68
21.2	22.54	49.60	21.4	13.80	54.26	21.5	60.92	36.06	21.5	40.34	47.67	21.6	60.35	18.04
22.2	22.29	49.44	22.4	13.59	54.48	22.5	60.69	36.37	22.5	40.32	48.04	22.6	60.44	18.38
23.2	22.05	49.30	23.4	13.39	54.68	23.5	60.47	36.66	23.5	40.30	48.39	23.6	60.54	18.71
24.2	21.82	49.16	24.4	13.20	54.88	24.5	60.28	36.95	24.5	40.30	48.72	24.6	60.64	19.03
25.2	21.59	49.04	25.4	13.02	55.10	25.5	60.10	37.25	25.5	40.31	49.06	25.6	60.75	19.33
26.2	21.34	48.95	26.4	12.85	55.35	26.5	59.94	37.56	26.5	40.33	49.40	26.6	60.88	19.63
27.2	21.08	48.86	27.4	12.66	55.60	27.5	59.77	37.90	27.5	40.37	49.77	27.6	61.02	19.95
28.2	20.80	48.75	28.4	12.46	55.87	28.4	59.58	38.27	28.5	40.41	50.17	28.6	61.17	20.29
29.2	20.51	48.63	29.4	12.25	56.15	29.4	59.37	38.64	29.5	40.43	50.59	29.6	61.31	20.65
30.2	20.21	48.48	30.4	12.02	56.43	30.4	59.13	39.01	30.5	40.44	51.02	30.6	61.44	21.03
31.2	19.92	48.31	31.4	11.78	56.69	31.4	58.87	39.37	31.5	40.43	51.46	31.6	61.56	21.43
32.2	19.63	48.13	32.4	11.53	56.92	32.4	58.58	39.72	32.5	40.39	51.89	32.6	61.66	21.83
	11.99	−11.94		11.10	−11.05		18.45	−18.42		12.24	−12.20		9.76	−9.71
	$1^{h}\ 42^{m}$	$17^{s}.46$		$5^{h}\ 47^{m}$	$1^{s}.50$		$7^{h}\ 17^{m}$	$41^{s}.19$		$9^{h}\ 9^{m}$	$30^{s}.42$		$10^{h}\ 59^{m}$	$56^{s}.70$
	−85° 12′	33″.92		−84° 49′	51″.91		−86° 53′	40″.29		−85° 18′	58″.68		−84° 7′	33″.14

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**31 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
Mean Solar Date.	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Feb.	1 42	−85 12	Feb.	5 47	−84 49	Feb.	7 17	−86 53	Feb.	9 9	−85 18	Feb.	11 0	−84 7
	s	″		s	″		s	″		s	″		s	″
1.2	19.63	48.13	1.4	11.53	56.92	1.4	58.58	39.72	1.5	40.39	51.89	1.6	1.66	21.83
2.2	19.36	47.92	2.4	11.27	57.12	2.4	58.28	40.05	2.5	40.33	52.30	2.6	1.75	22.23
3.2	19.10	47.70	3.4	11.02	57.30	3.4	57.96	40.34	3.5	40.27	52.68	3.6	1.82	22.62
4.2	18.86	47.49	4.4	10.77	57.46	4.4	57.66	40.62	4.5	40.20	53.05	4.6	1.89	23.00
5.2	18.64	47.29	5.4	10.54	57.63	5.4	57.37	40.89	5.5	40.13	53.40	5.6	1.94	23.37
6.2	18.43	47.08	6.4	10.31	57.78	6.4	57.09	41.16	6.5	40.07	53.75	6.6	2.00	23.72
7.2	18.21	46.88	7.4	10.09	57.93	7.4	56.82	41.42	7.5	40.02	54.09	7.6	2.07	24.06
8.2	17.99	46.70	8.4	9.88	58.09	8.4	56.55	41.69	8.5	39.97	54.44	8.6	2.14	24.40
9.2	17.77	46.52	9.4	9.67	58.27	9.4	56.30	41.96	9.5	39.92	54.78	9.6	2.22	24.74
10.2	17.54	46.34	10.4	9.45	58.47	10.4	56.05	42.25	10.5	39.89	55.14	10.6	2.30	25.08
11.2	17.29	46.17	11.3	9.23	58.66	11.4	55.79	42.56	11.5	39.85	55.52	11.6	2.39	25.44
12.2	17.03	45.98	12.3	8.99	58.86	12.4	55.51	42.89	12.5	39.81	55.92	12.6	2.48	25.83
13.2	16.75	45.77	13.3	8.72	59.07	13.4	55.21	43.22	13.5	39.76	56.33	13.6	2.57	26.24
14.2	16.48	45.54	14.3	8.44	59.27	14.4	54.86	43.55	14.5	39.69	56.76	14.6	2.65	26.65
15.2	16.22	45.28	15.3	8.15	59.45	15.4	54.49	43.86	15.5	39.59	57.19	15.6	2.71	27.09
16.2	15.97	44.99	16.3	7.86	59.60	16.4	54.10	44.15	16.5	39.47	57.61	16.6	2.75	27.53
17.2	15.73	44.69	17.3	7.56	59.72	17.4	53.69	44.41	17.5	39.33	58.00	17.5	2.78	27.96
18.2	15.52	44.39	18.3	7.27	59.82	18.4	53.28	44.65	18.5	39.18	58.36	18.5	2.79	28.38
19.2	15.33	44.09	19.3	6.99	59.90	19.4	52.87	44.87	19.5	39.04	58.71	19.5	2.79	28.78
20.2	15.15	43.80	20.3	6.73	59.97	20.4	52.50	45.07	20.5	38.91	59.04	20.5	2.79	29.16
21.2	14.96	43.54	21.3	6.48	60.05	21.4	52.15	45.29	21.5	38.79	59.36	21.5	2.80	29.52
22.1	14.77	43.30	22.3	6.23	60.16	22.4	51.82	45.52	22.5	38.69	59.68	22.5	2.83	29.88
23.1	14.57	43.07	23.3	5.99	60.29	23.4	51.50	45.77	23.5	38.60	60.02	23.5	2.87	30.24
24.1	14.35	42.83	24.3	5.73	60.42	24.4	51.17	46.04	24.5	38.51	60.39	24.5	2.92	30.62
25.1	14.12	42.58	25.3	5.46	60.57	25.4	50.83	46.32	25.5	38.41	60.78	25.5	2.97	31.02
26.1	13.88	42.31	26.3	5.17	60.72	26.4	50.45	46.60	26.4	38.30	61.18	26.5	3.01	31.44
27.1	13.64	42.02	27.3	4.87	60.85	27.4	50.04	46.88	27.4	38.17	61.57	27.5	3.04	31.88
28.1	13.41	41.71	28.3	4.57	60.96	28.4	49.62	47.15	28.4	38.02	61.97	28.5	3.05	32.32
29.1	13.19	41.38	29.3	4.27	61.03	29.4	49.18	47.38	29.4	37.85	62.34	29.5	3.04	32.76
30.1	13.00	41.04	30.3	3.96	61.09	30.4	48.73	47.60	30.4	37.67	62.70	30.5	3.02	33.18
	11.98	−11.94		11.10	−11.06		18.46	−18.44		12.25	−12.20		9.77	−9.72
	$1^h\ 42^m$	$17^s.46$		$5^h\ 47^m$	$1^s.50$		$7^h\ 17^m$	$41^s.19$		$9^h\ 9^m$	$30^s.42$		$10^h\ 59^m$	$56^s.70$
	−85° 12′	33″.92		−84° 49′	51″.91		−86° 53′	40″.29		−85° 18′	58″.68		−84° 7′	33″.14

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**31 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Mar.	1 42	−85 12	Mar.	5 46	−84 50	Mar.	7 17	−86 53	Mar.	9 9	−85 19	Mar.	11 0	−84 7
	s	″		s	″		s	″		s	″		s	″
1.1	13.19	41.38	1.3	64.27	1.03	1.4	49.18	47.38	1.4	37.85	2.34	1.5	3.04	32.76
2.1	13.00	41.04	2.3	63.96	1.09	2.4	48.73	47.60	2.4	37.67	2.70	2.5	3.02	33.18
3.1	12.82	40.70	3.3	63.67	1.14	3.4	48.29	47.78	3.4	37.49	3.04	3.5	3.00	33.59
4.1	12.66	40.37	4.3	63.39	1.16	4.4	47.86	47.96	4.4	37.30	3.35	4.5	2.97	33.97
5.1	12.51	40.04	5.3	63.11	1.18	5.4	47.44	48.12	5.4	37.12	3.65	5.5	2.93	34.34
6.1	12.36	39.73	6.3	62.84	1.19	6.3	47.03	48.28	6.4	36.95	3.95	6.5	2.89	34.71
7.1	12.21	39.43	7.3	62.57	1.21	7.3	46.64	48.43	7.4	36.78	4.25	7.5	2.86	35.08
8.1	12.07	39.14	8.3	62.31	1.25	8.3	46.27	48.59	8.4	36.63	4.54	8.5	2.84	35.44
9.1	11.91	38.85	9.3	62.06	1.30	9.3	45.89	48.77	9.4	36.49	4.84	9.5	2.84	35.80
10.1	11.74	38.56	10.3	61.80	1.35	10.3	45.51	48.96	10.4	36.34	5.16	10.5	2.84	36.17
11.1	11.55	38.27	11.3	61.54	1.42	11.3	45.12	49.17	11.4	36.19	5.50	11.5	2.84	36.55
12.1	11.36	37.96	12.3	61.25	1.49	12.3	44.72	49.38	12.4	36.03	5.85	12.5	2.84	36.95
13.1	11.17	37.63	13.3	60.95	1.55	13.3	44.29	49.60	13.4	35.86	6.21	13.5	2.83	37.36
14.1	10.98	37.28	14.3	60.64	1.59	14.3	43.82	49.80	14.4	35.66	6.57	14.5	2.80	37.79
15.1	10.80	36.90	15.3	60.32	1.61	15.3	43.33	49.99	15.4	35.44	6.92	15.5	2.75	38.22
16.1	10.64	36.51	16.3	60.00	1.60	16.3	42.82	50.15	16.4	35.21	7.26	16.5	2.69	38.65
17.1	10.50	36.11	17.3	59.68	1.57	17.3	42.31	50.28	17.4	34.96	7.57	17.5	2.61	39.06
18.1	10.39	35.72	18.3	59.38	1.51	18.3	41.82	50.39	18.4	34.72	7.85	18.5	2.52	39.46
19.1	10.29	35.34	19.2	59.09	1.43	19.3	41.35	50.49	19.4	34.48	8.11	19.5	2.43	39.83
20.1	10.20	34.98	20.2	58.82	1.37	20.3	40.90	50.58	20.4	34.26	8.35	20.5	2.35	40.18
21.1	10.10	34.63	21.2	58.56	1.32	21.3	40.47	50.68	21.4	34.05	8.60	21.5	2.28	40.52
22.1	9.99	34.30	22.2	58.30	1.30	22.3	40.06	50.80	22.4	33.86	8.87	22.5	2.23	40.87
23.1	9.86	33.98	23.2	58.04	1.29	23.3	39.65	50.93	23.4	33.67	9.15	23.5	2.19	41.23
24.1	9.72	33.66	24.2	57.77	1.30	24.3	39.22	51.08	24.4	33.49	9.45	24.5	2.15	41.61
25.1	9.58	33.32	25.2	57.48	1.30	25.3	38.78	51.24	25.4	33.30	9.75	25.5	2.10	42.00
26.1	9.43	32.96	26.2	57.18	1.29	26.3	38.32	51.39	26.4	33.08	10.07	26.4	2.05	42.40
27.1	9.29	32.58	27.2	56.87	1.26	27.3	37.84	51.53	27.4	32.84	10.38	27.4	1.98	42.81
28.1	9.16	32.18	28.2	56.56	1.22	28.3	37.34	51.66	28.4	32.59	10.68	28.4	1.89	43.21
29.1	9.04	31.78	29.2	56.25	1.15	29.3	36.82	51.75	29.4	32.32	10.96	29.4	1.79	43.60
30.1	8.95	31.37	30.2	55.95	1.05	30.3	36.31	51.81	30.4	32.05	11.21	30.4	1.68	43.97
31.0	8.88	30.96	31.2	55.66	0.93	31.3	35.81	51.86	31.4	31.78	11.44	31.4	1.56	44.33
32.0	8.82	30.56	32.2	55.39	0.81	32.3	35.33	51.90	32.4	31.52	11.66	32.4	1.44	44.67
	11.98	−11.93		11.11	−11.06		18.47	−18.45		12.25	−12.21		9.77	−9.72
	$1^h\ 42^m$	$17^s.46$		$5^h\ 47^m$	$1^s.50$		$7^h\ 17^m$	$41^s.19$		$9^h\ 9^m$	$30^s.42$		$10^h\ 59^m$	$56^s.70$
	$-85^\circ\ 12'$	$33''.92$		$-84^\circ\ 49'$	$51''.91$		$-86^\circ\ 53'$	$40''.29$		$-85^\circ\ 18'$	$58''.68$		$-84^\circ\ 7'$	$33''.14$

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis.			**31 Mensæ.**			**7 Octantis.**			**ζ Octantis.**			**η Octantis.**		
Mag. 5.6			Mag. 6.2			Mag. 6.4			Mag. 5.4			Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Apr.	1 42	−85 12	Apr.	5 46	−84 49	Apr.	7 17	−86 53	Apr.	9 9	−85 19	Apr.	10 59	−84 7
	s	″		s	″		s	″		s	″		s	″
1.0	8.82	30.56	1.2	55.39	60.81	1.3	35.33	51.90	1.4	31.52	11.66	1.4	61.44	44.67
2.0	8.78	30.18	2.2	55.12	60.69	2.3	34.87	51.93	2.4	31.26	11.86	2.4	61.32	45.00
3.0	8.73	29.81	3.2	54.86	60.58	3.3	34.42	51.95	3.3	31.01	12.06	3.4	61.21	45.32
4.0	8.68	29.46	4.2	54.62	60.47	4.3	33.99	51.98	4.3	30.77	12.25	4.4	61.11	45.63
5.0	8.63	29.11	5.2	54.38	60.37	5.3	33.57	52.02	5.3	30.54	12.44	5.4	61.01	45.93
6.0	8.56	28.77	6.2	54.14	60.29	6.3	33.16	52.08	6.3	30.32	12.65	6.4	60.92	46.24
7.0	8.48	28.43	7.2	53.89	60.22	7.3	32.73	52.15	7.3	30.11	12.88	7.4	60.84	46.57
8.0	8.39	28.08	8.2	53.63	60.16	8.3	32.29	52.23	8.3	29.89	13.12	8.4	60.76	46.92
9.0	8.30	27.71	9.2	53.35	60.08	9.3	31.83	52.30	9.3	29.66	13.37	9.4	60.67	47.28
10.0	8.21	27.32	10.2	53.07	59.98	10.3	31.35	52.38	10.3	29.41	13.61	10.4	60.57	47.64
11.0	8.13	26.92	11.2	52.78	59.87	11.2	30.84	52.43	11.3	29.14	13.86	11.4	60.46	48.01
12.0	8.07	26.50	12.2	52.48	59.74	12.2	30.31	52.47	12.3	28.85	14.09	12.4	60.32	48.37
13.0	8.03	26.07	13.2	52.19	59.57	13.2	29.78	52.46	13.3	28.55	14.29	13.4	60.17	48.71
14.0	8.01	25.63	14.2	51.91	59.39	14.2	29.26	52.44	14.3	28.24	14.47	14.4	60.00	49.03
15.0	8.01	25.20	15.2	51.65	59.20	15.2	28.77	52.40	15.3	27.93	14.62	15.4	59.84	49.34
16.0	8.02	24.80	16.2	51.40	59.00	16.2	28.30	52.35	16.3	27.64	14.76	16.4	59.68	49.63
17.0	8.03	24.42	17.2	51.17	58.81	17.2	27.86	52.30	17.3	27.37	14.88	17.4	59.53	49.90
17.9	8.04	24.06	18.2	50.95	58.64	18.2	27.44	52.27	18.3	27.12	15.02	18.4	59.40	50.17
18.9	8.02	23.72	19.2	50.73	58.49	19.2	27.03	52.26	19.3	26.88	15.16	19.4	59.28	50.45
19.9	8.00	23.38	20.2	50.50	58.36	20.2	26.62	52.26	20.3	26.64	15.32	20.4	59.17	50.74
20.9	7.97	23.03	21.2	50.25	58.24	21.2	26.18	52.28	21.3	26.40	15.50	21.4	59.06	51.04
21.9	7.93	22.66	22.2	50.00	58.11	22.2	25.72	52.29	22.3	26.14	15.69	22.4	58.94	51.35
22.9	7.89	22.26	23.2	49.74	57.97	23.2	25.25	52.30	23.3	25.86	15.88	23.4	58.80	51.67
23.9	7.86	21.85	24.2	49.47	57.81	24.2	24.76	52.30	24.3	25.56	16.06	24.4	58.65	51.99
24.9	7.85	21.43	25.1	49.20	57.62	25.2	24.26	52.27	25.3	25.27	16.22	25.4	58.49	52.30
25.9	7.87	21.01	26.1	48.95	57.40	26.2	23.76	52.21	26.3	24.97	16.36	26.4	58.32	52.59
26.9	7.90	20.61	27.1	48.70	57.16	27.2	23.28	52.13	27.3	24.66	16.46	27.4	58.14	52.86
27.9	7.94	20.21	28.1	48.47	56.92	28.2	22.81	52.03	28.3	24.35	16.55	28.4	57.95	53.11
28.9	7.99	19.82	29.1	48.25	56.68	29.2	22.36	51.91	29.3	24.05	16.63	29.4	57.76	53.35
29.9	8.06	19.44	30.1	48.05	56.44	30.2	21.93	51.78	30.3	23.77	16.69	30.4	57.59	53.57
30.9	8.12	19.09	31.1	47.86	56.20	31.2	21.52	51.67	31.3	23.50	16.75	31.3	57.43	53.78
31.9	8.18	18.75	32.1	47.67	55.98	32.2	21.12	51.59	32.3	23.24	16.82	32.3	57.26	53.99
	11.97	−11.93		11.10	−11.06		18.48	−18.45		12.26	−12.22		9.78	−9.73
	$1^{h}\ 42^{m}$	$17^{s}.46$		$5^{h}\ 47^{m}$	$1^{s}.50$		$7^{h}\ 17^{m}$	$41^{s}.19$		$9^{h}\ 9^{m}$	$30^{s}.42$		$10^{h}\ 59^{m}$	$56^{s}.70$
	−85° 12′	33″.92		−84° 49′	51″.91		−86° 53′	40″.29		−85° 18′	58″.68		−84° 7′	33″.14

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**81 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
May	1 42	−85 12	May	5 46	−84 49	May	7 17	−86 53	May	9 9	−85 19	May	10 59	−84 7
	s	″		s	″		s	″		s	″		s	″
1.9	8.18	18.75	1.1	47.86	56.20	1.2	21.52	51.67	1.3	23.50	16.75	1.3	57.43	53.78
2.9	8.23	18.41	2.1	47.67	55.98	2.2	21.12	51.59	2.3	23.24	16.82	2.3	57.26	53.99
3.9	8.27	18.07	3.1	47.49	55.77	3.2	20.73	51.51	3.3	22.99	16.88	3.3	57.11	54.19
4.9	8.30	17.74	4.1	47.30	55.58	4.2	20.34	51.44	4.3	22.74	16.96	4.3	56.97	54.40
5.9	8.32	17.39	5.1	47.10	55.39	5.2	19.95	51.38	5.3	22.49	17.06	5.3	56.83	54.63
6.9	8.34	17.03	6.1	46.89	55.21	6.2	19.64	51.33	6.3	22.23	17.15	6.3	56.69	54.88
7.9	8.37	16.65	7.1	46.67	55.01	7.2	19.12	51.27	7.3	21.96	17.27	7.3	56.53	55.13
8.9	8.41	16.24	8.1	46.45	54.80	8.2	18.67	51.20	8.3	21.67	17.38	8.3	56.36	55.39
9.9	8.47	15.83	9.1	46.22	54.57	9.2	18.21	51.10	9.3	21.37	17.47	9.3	56.17	55.65
10.9	8.55	15.42	10.1	46.00	54.30	10.2	17.74	50.98	10.2	21.05	17.55	10.3	55.97	55.90
11.9	8.66	15.03	11.1	45.79	54.01	11.2	17.28	50.83	11.2	20.72	17.60	11.3	55.78	56.12
12.9	8.78	14.65	12.1	45.59	53.71	12.2	16.83	50.66	12.2	20.40	17.63	12.3	55.55	56.31
13.9	8.90	14.29	13.1	45.41	53.40	13.2	16.41	50.48	13.2	20.09	17.62	13.3	55.34	56.48
14.9	9.02	13.97	14.1	45.25	53.10	14.2	16.03	50.30	14.2	19.80	17.60	14.3	55.14	56.64
15.9	9.13	13.66	15.1	45.10	52.82	15.2	15.67	50.13	15.2	19.53	17.59	15.3	54.95	56.78
16.9	9.22	13.35	16.1	44.96	52.57	16.2	15.33	49.98	16.2	19.28	17.58	16.3	54.78	56.92
17.9	9.29	13.05	17.1	44.81	52.33	17.2	14.99	49.85	17.2	19.04	17.61	17.3	54.62	57.08
18.9	9.35	12.73	18.1	44.65	52.10	18.1	14.64	49.74	18.2	18.80	17.64	18.3	54.46	57.25
19.9	9.42	12.40	19.1	44.48	51.88	19.1	14.27	49.63	19.2	18.55	17.69	19.3	54.30	57.43
20.9	9.50	12.04	20.1	44.30	51.64	20.1	13.88	49.51	20.2	18.28	17.74	20.3	54.14	57.63
21.9	9.59	11.66	21.1	44.11	51.38	21.1	13.47	49.37	21.2	17.99	17.78	21.3	53.95	57.82
22.9	9.70	11.29	22.1	43.93	51.11	22.1	13.06	49.22	22.2	17.69	17.80	22.3	53.75	58.01
23.9	9.83	10.92	23.1	43.76	50.81	23.1	12.65	49.04	23.2	17.38	17.80	23.3	53.54	58.18
24.9	9.98	10.57	24.1	43.59	50.49	24.1	12.25	48.85	24.2	17.08	17.77	24.3	53.32	58.34
25.9	10.15	10.24	25.1	43.44	50.15	25.1	11.86	48.63	25.2	16.78	17.73	25.3	53.10	58.47
26.9	10.31	9.92	26.1	43.30	49.82	26.1	11.49	48.39	26.2	16.49	17.66	26.3	52.87	58.58
27.9	10.48	9.62	27.1	43.18	49.49	27.1	11.15	48.16	27.2	16.21	17.58	27.3	52.65	58.67
28.9	10.65	9.33	28.1	43.08	49.17	28.1	10.85	47.92	28.2	15.94	17.49	28.3	52.45	58.75
29.9	10.81	9.06	29.1	42.99	48.86	29.1	10.55	47.70	29.2	15.69	17.41	29.3	52.26	58.82
30.9	10.96	8.79	30.1	42.90	48.57	30.1	10.27	47.49	30.2	15.45	17.33	30.3	52.08	58.88
31.9	11.09	8.53	31.1	42.80	48.29	31.1	10.00	47.29	31.2	15.22	17.26	31.3	51.90	58.95
32.9	11.21	8.26	32.0	42.70	48.02	32.1	9.72	47.11	32.2	15.00	17.20	32.3	51.72	59.04
	11.96	−11.92		11.10	−11.05		18.48	−18.45		12.26	−12.22		9.78	−9.73
	1ʰ 42ᵐ	17ˢ.46		5ʰ 47ᵐ	1ˢ.50		7ʰ 17ᵐ	41ˢ.19		9ʰ 9ᵐ	30ˢ.42		10ʰ 59ᵐ	56ˢ.70
	−85° 12′	33″.92		−84° 49′	51″.91		−86° 53′	40″.29		−85° 18′	58″.68		−84° 7′	33″.14

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis.
Mag. 5.6

Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′
June	1 42	−85 12
	s	″
1.9	11.21	8.26
2.9	11.33	7.97
3.9	11.45	7.67
4.9	11.58	7.36
5.9	11.73	7.02
6.9	11.90	6.69
7.9	12.09	6.38
8.9	12.30	6.07
9.9	12.52	5.79
10.9	12.74	5.55
11.8	12.94	5.33
12.8	13.13	5.11
13.8	13.31	4.90
14.8	13.47	4.69
15.8	13.63	4.46
16.8	13.79	4.20
17.8	13.96	3.95
18.8	14.15	3.69
19.8	14.36	3.43
20.8	14.59	3.17
21.8	14.83	2.94
22.8	15.07	2.72
23.8	15.32	2.53
24.8	15.57	2.35
25.8	15.80	2.18
26.8	16.03	2.04
27.8	16.24	1.90
28.8	16.44	1.75
29.8	16.64	1.60
30.8	16.83	1.44
31.8	17.02	1.26
32.8	17.23	1.05

11.95 −11.91
$1^h\ 42^m\ \ 17^s.46$
$-85°\ 12'\ \ 33''.92$

31 Mensæ.
Mag. 6.2

Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′
June	5 46	−84 49
	s	″
1.0	42.70	48.02
2.0	42.59	47.77
3.0	42.47	47.51
4.0	42.34	47.23
5.0	42.21	46.92
6.0	42.08	46.60
7.0	41.96	46.26
8.0	41.86	45.90
9.0	41.78	45.53
10.0	41.71	45.17
11.0	41.66	44.82
12.0	41.62	44.50
13.0	41.58	44.20
14.0	41.53	43.92
15.0	41.47	43.66
16.0	41.40	43.39
17.0	41.33	43.10
18.0	41.25	42.79
18.9	41.18	42.45
19.9	41.12	42.10
20.9	41.08	41.74
21.9	41.05	41.36
22.9	41.03	40.99
23.9	41.03	40.63
24.9	41.04	40.29
25.9	41.06	39.96
26.9	41.08	39.65
27.9	41.09	39.36
28.9	41.10	39.08
29.9	41.11	38.80
30.9	41.10	38.51
31.9	41.08	38.20

11.10 −11.05
$5^h\ 47^m\ \ 1^s.50$
$-84°\ 49'\ \ 51''.91$

7 Octantis.
Mag. 6.4

Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′
June	7 17	−86 53
	s	″
1.1	9.72	47.11
2.1	9.42	46.94
3.1	9.11	46.77
4.1	8.78	46.59
5.1	8.44	46.39
6.1	8.08	46.17
7.1	7.73	45.92
8.1	7.40	45.65
9.1	7.09	45.36
10.1	6.82	45.08
11.1	6.58	44.79
12.1	6.37	44.52
13.1	6.17	44.27
14.1	5.96	44.04
15.1	5.74	43.83
16.1	5.50	43.63
17.1	5.24	43.41
18.1	4.97	43.16
19.1	4.71	42.90
20.1	4.45	42.62
21.1	4.21	42.32
22.1	3.99	42.00
23.0	3.80	41.68
24.0	3.63	41.35
25.0	3.48	41.03
26.0	3.35	40.72
27.0	3.24	40.44
28.0	3.13	40.17
29.0	3.01	39.92
30.0	2.87	39.68
31.0	2.71	39.43
32.0	2.53	39.18

18.46 −18.44
$7^h\ 17^m\ \ 41^s.19$
$-86°\ 53'\ \ 40''.29$

ζ Octantis.
Mag. 5.4

Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′
June	9 9	−85 19
	s	″
1.2	15.00	17.20
2.2	14.76	17.16
3.2	14.52	17.12
4 2	14.27	17.09
5.2	13.99	17.05
6.2	13.71	16.98
7.2	13.42	16.90
8.2	13.12	16.79
9.2	12.84	16.64
10.2	12.58	16.49
11.2	12.35	16.33
12.2	12.13	16.18
13.2	11.93	16.04
14.2	11.73	15.92
15.1	11.52	15.82
16.1	11.31	15.72
17.1	11.08	15.63
18.1	10.84	15.52
19.1	10.58	15.38
20.1	10.33	15.22
21.1	10.08	15.05
22.1	9.84	14.85
23.1	9.61	14.64
24.1	9.41	14.41
25.1	9.22	14.19
26.1	9.04	13.98
27.1	8.87	13.78
28.1	8.70	13.59
29.1	8.52	13.41
30.1	8.34	13.25
31.1	8.15	13.09
32.1	7.95	12.92

12.26 −12.22
$9^h\ 9^m\ \ 30^s.42$
$-85°\ 18'\ \ 58''.68$

η Octantis.
Mag. 6.3

Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′
June	10 59	−84 7
	s	″
1.3	51.72	59.04
2.3	51.55	59.14
3.3	51.38	59.24
4.3	51.20	59.36
5.3	51.00	59.48
6.3	50.78	59.60
7.2	50.55	59.69
8.2	50.32	59.74
9.2	50.09	59.77
10.2	49.86	59.78
11.2	49.65	59.78
12.2	49.46	59.77
13.2	49.28	59.77
14.2	49.11	59.78
15.2	48.94	59.81
16.2	48.77	59.86
17.2	48.58	59.90
18.2	48.38	59.94
19.2	48.17	59.96
20.2	47.95	59.97
21.2	47.72	59.96
22.2	47.49	59.93
23.2	47.27	59.87
24.2	47.06	59.80
25.2	46.86	59.71
26.2	46.68	59.62
27.2	46.51	59.55
28.2	46.35	59.48
29.2	46.19	59.42
30.2	46.04	59.37
31.2	45.86	59.34
32.2	45.67	59.31

9.78 −9.73
$10^h\ 59^m\ \ 56^s.70$
$-84°\ 7'\ \ 33''.14$

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**31 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
July	1 42	−85 11	July	5 46	−84 49	July	7 17	−86 53	July	9 9	−85 19	July	10 59	−84 7
	s	″		s	″		s	″		s	″		s	″
1.8	17.02	61.26	1.9	41.08	38.20	1.0	2.71	39.43	1.1	8.15	13.09	1.2	45.86	59.34
2.8	17.23	61.05	2.9	41.06	37.88	2.0	2.53	39.18	2.1	7.95	12.92	2.2	45.67	59.31
3.8	17.46	60.84	3.9	41.05	37.55	3.0	2.35	38.90	3.1	7.74	12.75	3.2	45.47	59.28
4.8	17.70	60.64	4.9	41.04	37.19	4.0	2.17	38.59	4.1	7.53	12.55	4.2	45.26	59.22
5.8	17.96	60.46	5.9	41.06	36.81	5.0	2.00	38.25	5.1	7.32	12.32	5.2	45.04	59.15
6.8	18.24	60.31	6.9	41.10	36.44	6.0	1.85	37.90	6.1	7.13	12.07	6.2	44.83	59.04
7.8	18.52	60.19	7.9	41.16	36.09	7.0	1.74	37.55	7.1	6.94	11 80	7.2	44.62	58.92
8.8	18.79	60.08	8.9	41.23	35.76	8.0	1.67	37.21	8.1	6.78	11.52	8.2	44.42	58.77
9.8	19.04	60.00	9.9	41.30	35.45	9.0	1.62	36.88	9.1	6.63	11.25	9.2	44.24	58.61
10.8	19.27	59.94	10.9	41.38	35.16	10.0	1.60	36.59	10.1	6.50	10.99	10.2	44.08	58.45
11.8	19.48	59.87	11.9	41.44	34.90	11.0	1.58	36.30	11.1	6.38	10.75	11.2	43.93	58.31
12.8	19.69	59.78	12.9	41.49	34.64	11.9	1.54	36.03	12.1	6.25	10.52	12.2	43.79	58.18
13.8	19.90	59.68	13.9	41.53	34.37	12.9	1.49	35.76	13.1	6.12	10.31	13.1	43.65	58.07
14.8	20.12	59.57	14.9	41.58	34.09	13.9	1.42	35.50	14.1	5.98	10.11	14.1	43.50	57.97
15.8	20.35	59.45	15.9	41.62	33.79	14.9	1.34	35.23	15.1	5.83	9.90	15.1	43.34	57.87
16.8	20.60	59.33	16.9	41.67	33.47	15.9	1.25	34.93	16.1	5.68	9.67	16.1	43.16	57.76
17.7	20.86	59.22	17.9	41.73	33.13	16.9	1.17	34.62	17.1	5.53	9.42	17.1	42.98	57.63
18.7	21.13	59.13	18.9	41.80	32.79	17.9	1.11	34.29	18.1	5.37	9.15	18.1	42.79	57.48
19.7	21.41	59.06	19.9	41.89	32.46	18.9	1.07	33.94	19.1	5.23	8.86	19.1	42.60	57.30
20.7	21.69	59.00	20.9	42.00	32.13	19.9	1.06	33.58	20.1	5.11	8.56	20.1	42.42	57.11
21.7	21.97	58.97	21.9	42.11	31.82	20.9	1.07	33.23	21.1	5.00	8.24	21.1	42.25	56.90
22.7	22.24	58.97	22.9	42.24	31.52	21.9	1.11	32.89	22.0	4.90	7.92	22.1	42.09	56.68
23.7	22.50	58.97	23.9	42.37	31.25	22.9	1.16	32.56	23.0	4.81	7.60	23.1	41.94	56.45
24.7	22.75	58.98	24.9	42.50	31.00	23.9	1.22	32.24	24.0	4.73	7.30	24.1	41.80	56.23
25.7	22.98	58.99	25.9	42.62	30.76	24.9	1.29	31.95	25.0	4.66	7.02	25.1	41.68	56.02
26.7	23.20	58.99	26.9	42.74	30.53	25.9	1.37	31.67	26.0	4.60	6.75	26.1	41.56	55.81
27.7	23.41	58.99	27.9	42.85	30.29	26.9	1.43	31.40	27.0	4.53	6.49	27.1	41.45	55.62
28.7	23.63	58.97	28.9	42.94	30.05	27.9	1.48	31.14	28.0	4.45	6.24	28.1	41.33	55.45
29.7	23.86	58.94	29.9	43.03	29.79	28.9	1.51	30.88	29.0	4.36	5.99	29.1	41.21	55.28
30.7	24.10	58.90	30.9	43.13	29.51	29.9	1.53	30.61	30.0	4.26	5.74	30.1	41.06	55.12
31.7	24.36	58.86	31.9	43.23	29.21	30.9	1.54	30.32	31.0	4.16	5.48	31.1	40.91	54.94
32.7	24.63	58.82	32.9	43.34	28.90	31.9	1.55	30.00	32.0	4.06	5.19	32.1	40.75	54.74
	11.95	−11.91		11.09	−11.04		18.45	−18.42		12.25	−12.21		9.78	−9.73
	$1^{h}\ 42^{m}$	$17^{s}.46$		$5^{h}\ 47^{m}$	$1^{s}.50$		$7^{h}\ 17^{m}$	$41^{s}.19$		$9^{h}\ 9^{m}$	$30^{s}.42$		$10^{h}\ 59^{m}$	$56^{s}.70$
	−85° 12′	33″.92		−84° 49′	51″.91		−86° 53′	40″.29		−85° 18′	58″.68		−84° 7′	33″.14

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**31 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Aug.	1 42	-85 11	Aug.	5 46	-84 49	Aug.	7 17	-86 53	Aug.	9 9	-85 18	Aug.	10 59	-84 7
	s	″		s	″		s	″		s	″		s	″
1.7	24.63	58.82	1.9	43 34	28.90	1.9	1.58	29.66	1.0	4.06	65.19	1.1	40.75	54.74
2.7	24.91	58.81	2.9	43.48	28.59	2.9	1.65	29.30	2.0	3.97	64.87	2.1	40.58	54.53
3.7	25.20	58.83	3.9	43.64	28.30	3.9	1.75	28.95	3.0	3.90	64.54	3.1	40.43	54.29
4.7	25.48	58.88	4.9	43.80	28.03	4.9	1.89	28.62	4.0	3.85	64.19	4.1	40.29	54.02
5.7	25.74	58.95	5.9	43.98	27.78	5.9	2.05	28.32	5.0	3.81	63.85	5.1	40.17	53.74
6.7	25.98	59.03	6.9	44.16	27.56	6.9	2.22	28.04	6.0	3.79	63.52	6.1	40.06	53.46
7.7	26.20	59.12	7.9	44.32	27.37	7.9	2.38	27.79	7.0	3.78	63.22	7.1	39.98	53.20
8.7	26.41	59.21	8.9	44.49	27.19	8.9	2.53	27.54	8.0	3.77	62.94	8.1	39.90	52.95
9.7	26.61	59.28	9.9	44.63	27.01	9.9	2.67	27.30	8.9	3.76	62.67	9.1	39.82	52.71
10.7	26.81	59.33	10.9	44.76	26.82	10.9	2.78	27.05	9.9	3.75	62.41	10.1	39.74	52.49
11.7	27.03	59.37	11.9	44.89	26.61	11.9	2.89	26.79	10.9	3.73	62.15	11.1	39.65	52.27
12.7	27.26	59.41	12.8	45.03	26.37	12.9	2.99	26.52	11.9	3.70	61.88	12.1	39.55	52.05
13.7	27.50	59.46	13.8	45.19	26.13	13.9	3.10	26.22	12.9	3.66	61.59	13.1	39.44	51.83
14.7	27.76	59.53	14.8	45.36	25.88	14.9	3.24	25.90	13.9	3.62	61.29	14.1	39.32	51.59
15.7	28.02	59.61	15.8	45.54	25.64	15.9	3.41	25.59	14.9	3.60	60.97	15.1	39.21	51.31
16.7	28.29	59.71	16.8	45.74	25.41	16.9	3.60	25.28	15.9	3.59	60.63	16.1	39.10	51.02
17.7	28.55	59.83	17.8	45.95	25.19	17.9	3.81	24.99	16.9	3.59	60.28	17.1	39.00	50.72
18.7	28.80	59.97	18.8	46.16	24.99	18.9	4.05	24.70	17.9	3.62	59.93	18.1	38.91	50.42
19.7	29.04	60.13	19.8	46.38	24.81	19.9	4.31	24.43	18.9	3.66	59.59	19.0	38.84	50.10
20.7	29.27	60.30	20.8	46.60	24.65	20.9	4.57	24.19	19.9	3.70	59.26	20.0	38.78	49.78
21.7	29.48	60.47	21.8	46.81	24.52	21.9	4.83	23.96	20.9	3.76	58.94	21.0	38.74	49.47
22.7	29.67	60.64	22.8	47.01	24.40	22.9	5.08	23.75	21.9	3.82	58.63	22.0	38.69	49.17
23.6	29.86	60.80	23.8	47.20	24.28	23.9	5.31	23.55	22.9	3.88	58.35	23.0	38.66	48.89
24.6	30.04	60.94	24.8	47.38	24.16	24.9	5.52	23.36	23.9	3.94	58.09	24.0	38.63	48.62
25.6	30.22	61.06	25.8	47.56	24.03	25.9	5.72	23.15	24.9	3.99	57.84	25.0	38.59	48.36
26.6	30.41	61.18	26.8	47.72	23.88	26.9	5.91	22.92	25.9	4.02	57.58	26.0	38.54	48.12
27.6	30.61	61.29	27.8	47.89	23.71	27.9	6.10	22.68	26.9	4.05	57.31	27.0	38.48	47.86
28.6	30.83	61.41	28.8	48.08	23.52	28.9	6.30	22.42	27.9	4.08	57.02	28.0	38.42	47.59
29.6	31.06	61.55	29.8	48.29	23.34	29.9	6.52	22.15	28.9	4.11	56.72	29.0	38.35	47.31
30.6	31.30	61.71	30.8	48.51	23.17	30.9	6.78	21.88	29.9	4.15	56.41	30.0	38.28	47.00
31.6	31.53	61.90	31.8	48.74	23.01	31.9	7.07	21.63	30.9	4.21	56.08	31.0	38.22	46.66
32.6	31.75	62.11	32.8	48.98	22.89	32.9	7.39	21.40	31.9	4.29	55.74	32.0	38.18	46.33
11.95		-11.91	11.08		-11.04	18.43		-18.41	12.25		-12.21	9.78		-9.73
$1^h\ 42^m$		$17^s.46$	$5^h\ 47^m$		$1^s.50$	$7^h\ 17^m$		$41^s.19$	$9^h\ 9^m$		$30^s.42$	$10^h\ 59^m$		$56^s.70$
-85° 12′		33″.92	-84° 49′		51″.91	-86° 53′		40″.29	-85° 18′		58″.68	-84° 7′		33″.14

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**31 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Sept.	1 42	−85 12	Sept.	5 46	−84 49	Sept.	7 17	−86 53	Sept.	9 9	−85 18	Sept.	10 59	−84 7
	s	″		s	″		s	″		s	″		s	″
1.6	31.75	2.11	1.8	48.98	22.89	1.9	7.39	21.40	1.9	4.40	55.42	1.0	38.18	46.33
2.6	31.95	2.34	2.8	49.22	22.80	2.9	7.71	21.19	2.9	4.52	55.12	2.0	38.16	46.00
3.6	32.12	2.58	3.8	49.46	22.74	3.9	8.04	21.01	3.9	4.64	54.84	3.0	38.16	45.68
4.6	32.27	2.81	4.8	49.69	22.69	4.8	8.36	20.86	4.9	4.75	54.59	4.0	38.16	45.37
5.6	32.40	3.04	5.8	49.90	22.65	5.8	8.67	20.72	5.9	4.86	54.36	5.0	38.18	45.08
6.6	32.54	3.24	6.8	50.09	22.60	6.8	8.95	20.57	6.9	4.98	54.13	5.9	38.21	44.81
7.6	32.68	3.44	7.8	50.29	22.54	7.8	9.21	20.42	7.9	5.08	53.90	6.9	38.22	44.53
8.6	32.84	3.62	8.8	50.48	22.46	8.8	9.47	20.25	8.9	5.19	53.65	7.9	38.23	44.27
9.6	33.00	3.81	9.8	50.68	22.37	9.8	9.74	20.07	9.9	5.28	53.39	8.9	38.22	44.00
10.6	33.18	4.00	10.8	50.90	22.28	10.8	10.02	19.87	10.9	5.37	53.11	9.9	38.21	43.71
11.6	33.37	4.21	11.8	51.13	22.18	11.8	10.32	19.67	11.9	5.47	52.81	10.9	38.19	43.41
12.6	33.56	4.43	12.8	51.37	22.09	12.8	10.64	19.47	12.9	5.59	52.51	11.9	38.18	43.10
13.6	33.75	4.68	13.8	51.63	22.01	13.8	10.99	19.28	13.9	5.73	52.21	12.9	38.17	42.77
14.6	33.93	4.95	14.8	51.89	21.96	14.8	11.36	19.09	14.9	5.88	51.91	13.9	38.18	42.42
15.6	34.09	5.23	15.8	52.15	21.93	15.8	11.75	18.93	15.9	6.05	51.62	14.9	38.19	42.08
16.6	34.24	5.54	16.8	52.40	21.93	16.8	12.14	18.79	16.9	6.23	51.36	15.9	38.22	41.74
17.6	34.37	5.84	17.7	52.66	21.94	17.8	12.53	18.68	17.9	6.41	51.11	16.9	38.27	41.41
18.6	34.48	6.14	18.7	52.91	21.97	18.8	12.92	18.58	18.9	6.61	50.88	17.9	38.34	41.09
19.6	34.58	6.43	19.7	53.14	22.01	19.8	13.29	18.50	19.9	6.80	50.67	18.9	38.41	40.78
20.6	34.67	6.70	20.7	53.36	22.05	20.8	13.63	18.43	20.9	6.98	50.48	19.9	38.49	40.49
21.6	34.75	6.95	21.7	53.56	22.08	21.8	13.96	18.36	21.9	7.15	50.29	20.9	38.56	40.22
22.6	34.84	7.18	22.7	53.76	22.09	22.8	14.28	18.28	22.9	7.30	50.10	21.9	38.62	39.97
23.6	34.94	7.41	23.7	53.97	22.09	23.8	14.58	18.17	23.9	7.45	49.90	22.9	38.67	39.72
24.6	35.06	7.65	24.7	54.18	22.09	24.8	14.89	18.06	24.9	7.58	49.68	23.9	38.71	39.46
25.6	35.19	7.90	25.7	54.39	22.07	25.8	15.22	17.95	25.9	7.73	49.45	24.9	38.74	39.19
26.6	35.32	8.17	26.7	54.62	22.06	26.8	15.58	17.82	26.9	7.89	49.20	25.9	38.78	38.90
27.6	35.45	8.45	27.7	54.88	22.07	27.8	15.96	17.70	27.9	8.08	48.96	26.9	38.82	38.60
28.6	35.57	8.75	28.7	55.14	22.10	28.8	16.37	17.60	28.9	8.29	48.72	27.9	38.88	38.28
29.5	35.67	9.07	29.7	55.40	22.17	29.8	16.80	17.53	29.9	8.51	48.50	28.9	38.96	37.96
30.5	35.75	9.41	30.7	55.64	22.27	30.8	17.22	17.49	30.9	8.74	48.30	29.9	39.06	37.65
31.5	35.80	9.74	31.7	55.88	22.38	31.8	17.64	17.48	31.9	8.99	48.14	30.9	39.17	37.35
32.5	35.83	10.06	32.7	56.11	22.51	32.8	18.03	17.49	32.9	9.23	48.00	31.9	39.29	37.08
11.95		−11.91	11.08		−11.04	18.42		−18.40	12.24		−12.20	9.78		−9.72
$1^h\ 42^m$		$17^s.46$	$5^h\ 47^m$		$1^s.50$	$7^h\ 17^m$		$41^s.19$	$9^h\ 9^m$		$30^s.42$	$10^h\ 59^m$		$56^s.70$
−85° 12′		33″.92	−84° 49′		51″.91	−86° 53′		40″.29	−85° 18′		58″.68	−84° 7′		33″.14

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis.			**31 Mensæ.**			**7 Octantis.**			**ζ Octantis.**			***η* Octantis.**		
Mag. 5.6			Mag. 6.2			Mag. 6.4			Mag. 5.4			Mag. 6.3		
Mean Solar Date.	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Oct.	1 42	−85 12	Oct.	5 46	−84 49	Oct.	7 17	−86 53	Oct.	9 9	−85 18	Oct.	10 59	−84 7
	s	″		s	″		s	″		s	″		s	″
1.5	35.80	9.74	1.7	55.88	22.38	1.8	17.64	17.48	1.9	8.99	48.14	1.9	39.29	37.08
2.5	35.83	10.06	2.7	56.11	22.51	2.8	18.03	17.49	2.8	9.23	48.00	2.9	39.42	36.83
3.5	35.86	10.36	3.7	56.31	22.64	3.8	18.39	17.50	3.8	9.45	47.88	3.9	39.54	36.60
4.5	35.88	10.64	4.7	56.50	22.75	4.8	18.74	17.51	4.8	9.65	47.76	4.9	39.65	36.38
5.5	35.92	10.91	5.7	56.69	22.86	5.8	19.08	17.50	5.8	9.85	47.63	5.9	39.75	36.16
6.5	35.96	11.17	6.7	56.89	22.94	6.8	19.42	17.47	6.8	10.04	47.48	6.9	39.84	35.93
7.5	36.02	11.44	7.7	57.09	23.01	7.8	19.75	17.44	7.8	10.22	47.32	7.9	39.93	35.68
8.5	36.09	11.72	8.7	57.30	23.08	8.8	20.11	17.40	8.8	10.42	47.15	8.9	40.02	35.42
9.5	36.16	12.01	9.7	57.53	23.16	9.8	20.49	17.35	9.8	10.63	46.97	9.9	40.11	35.15
10.5	36.23	12.32	10.7	57.77	23.24	10.7	20.90	17.32	10.8	10.85	46.79	10.9	40.22	34.87
11.5	36.29	12.64	11.7	58.01	23.35	11.7	21.32	17.29	11.8	11.09	46.62	11.9	40.34	34.58
12.5	36.33	12.99	12.7	58.25	23.48	12.7	21.76	17.28	12.8	11.35	46.45	12.9	40.47	34.30
13.5	36.36	13.34	13.7	58.49	23.63	13.7	22.20	17.30	13.8	11.62	46.30	13.9	40.62	34.03
14.5	36.37	13.69	14.7	58.72	23.81	14.7	22.64	17.34	14.8	11.90	46.18	14.9	40.78	33.77
15.5	36.36	14.04	15.7	58.95	24.00	15.7	23.07	17.41	15.8	12.18	46.09	15.9	40.94	33.53
16.5	36.34	14.38	16.7	59.17	24.21	16.7	23.48	17.49	16.8	12.45	46.01	16.9	41.11	33.32
17.5	36.31	14.70	17.7	59.36	24.41	17.7	23.87	17.59	17.8	12.72	45.94	17.9	41.28	33.12
18.5	36.27	15.01	18.7	59.53	24.61	18.7	24.23	17.69	18.8	12.97	45.89	18.9	41.45	32.93
19.5	36.23	15.30	19.7	59.70	24.80	19.7	24.57	17.77	19.8	13.21	45.85	19.9	41.61	32.76
20.5	36.20	15.57	20.7	59.87	24.97	20.7	24.89	17.85	20.8	13.43	45.80	20.9	41.75	32.60
21.5	36.18	15.84	21.7	60.04	25.13	21.7	25.22	17.91	21.8	13.65	45.74	21.9	41.88	32.43
22.5	36.17	16.11	22.7	60.22	25.27	22.7	25.56	17.96	22.8	13.86	45.66	22.9	42.01	32.25
23.5	36.17	16.40	23.7	60.41	25.42	23.7	25.92	18.00	23.8	14.09	45.56	23.9	42.14	32.04
24.5	36.17	16.70	24.6	60.61	25.58	24.7	26.30	18.05	24.8	14.34	45.46	24.9	42.28	31.83
25.5	36.16	17.04	25.6	60.82	25.76	25.7	26.69	18.11	25.8	14.60	45.38	25.9	42.44	31.61
26.5	36.14	17.38	26.6	61.03	25.97	26.7	27.10	18.20	26.8	14.88	45.31	26.9	42.63	31.39
27.5	36.09	17.73	27.6	61.24	26.22	27.7	27.53	18.33	27.8	15.17	45.26	27.9	42.83	31.19
28.5	36.01	18.08	28.6	61.43	26.49	28.7	27.94	18.48	28.8	15.47	45.24	28.9	43.04	31.01
29.5	35.91	18.42	29.6	61.60	26.77	29.7	28.32	18.65	29.8	15.76	45.26	29.9	43.25	30.86
30.5	35.81	18.74	30.6	61.75	27.06	30.7	28.68	18.83	30.8	16.04	45.30	30.8	43.46	30.75
31.5	35.70	19.02	31.6	61.89	27.34	31.7	29.01	19.02	31.8	16.31	45.34	31.8	43.65	30.66
32.5	35.59	19.29	32.6	62.02	27.60	32.7	29.32	19.19	32.8	16.56	45.38	32.8	43.84	30.56
	11.96	−11.92		11.08	−11.04		18.42	−18.39		12.24	−12.20		9.77	−9.72
	$1^h\ 42^m$	$17^s.46$		$5^h\ 47^m$	$1^s.50$		$7^h\ 17^m$	$41^s.19$		$9^h\ 9^m$	$30^s.42$		$10^h\ 59^m$	$56^s.70$
	−85° 12′	33″.92		−84° 49′	51″.91		−86° 53′	40″.29		−85° 18′	58″.68		−84° 7′	33″.14

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**31 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Nov.	1 42	−85 12	Nov.	5 47	−84 49	Nov.	7 17	−86 53	Nov.	9 9	−85 18	Nov.	10 59	−84 7
	s	″		s	″		s	″		s	″		s	″
1.5	35.59	19.29	1.6	2.02	27.60	1.7	29.32	19.19	1.8	16.56	45.38	1.8	43.84	30.56
2.5	35.50	19.55	2.6	2.15	27.84	2.7	29.62	19.35	2.8	16.80	45.41	2.8	44.01	30.46
3.5	35.41	19.80	3.6	2.28	28.06	3.7	29.92	19.49	3.8	17.03	45.42	3.8	44.18	30.35
4.4	35.34	20.07	4.6	2.42	28.27	4.7	30.24	19.61	4.8	17.26	45.42	4.8	44.34	30.22
5.4	35.28	20.35	5.6	2.57	28.49	5.7	30.56	19.74	5.8	17.50	45.42	5.8	44.52	30.09
6.4	35.22	20.64	6.6	2.73	28.72	6.7	30.90	19.87	6.8	17.75	45.41	6.8	44.70	29.95
7.4	35.15	20.94	7.6	2.89	28.97	7.7	31.26	20.01	7.8	18.02	45.41	7.8	44.89	29.80
8.4	35.07	21.26	8.6	3.06	29.23	8.7	31.63	20.17	8.7	18.30	45.41	8.8	45.08	29.65
9.4	34.98	21.59	9.6	3.22	29.51	9.7	32.01	20.35	9.7	18.60	45.44	9.8	45.30	29.51
10.4	34.87	21.91	10.6	3.38	29.81	10.7	32.39	20.55	10.7	18.90	45.48	10.8	45.53	29.39
11.4	34.73	22.23	11.6	3.53	30.12	11.7	32.76	20.78	11.7	19.21	45.55	11.8	45.77	29.30
12.4	34.57	22.55	12.6	3.66	30.46	12.7	33.10	21.03	12.7	19.51	45.64	12.8	46.01	29.21
13.4	34.41	22.84	13.6	3.78	30.80	13.7	33.42	21.28	13.7	19.79	45.75	13.8	46.24	29.16
14.4	34.24	23.11	14.6	3.88	31.13	14.7	33.72	21.54	14.7	20.06	45.87	14.8	46.47	29.13
15.4	34.07	23.35	15.6	3.96	31.45	15.7	33.99	21.79	15.7	20.31	46.00	15.8	46.69	29.11
16.4	33.91	23.57	16.6	4.04	31.75	16.7	34.23	22.03	16.7	20.54	46.13	16.8	46.90	29.10
17.4	33.76	23.78	17.6	4.11	32.04	17.6	34.46	22.25	17.7	20.77	46.25	17.8	47.10	29.09
18.4	33.62	24.00	18.6	4.19	32.31	18.6	34.69	22.46	18.7	20.99	46.35	18.8	47.29	29.07
19.4	33.49	24.21	19.6	4.27	32.57	19.6	34.94	22.67	19.7	21.21	46.44	19.8	47.47	29.03
20.4	33.37	24.45	20.6	4.37	32.83	20.6	35.21	22.87	20.7	21.45	46.52	20.8	47.66	28.98
21.4	33.24	24.70	21.6	4.48	33.11	21.6	35.50	23.07	21.7	21.71	46.60	21.8	47.86	28.92
22.4	33.10	24.97	22.6	4.59	33.41	22.6	35.81	23.30	22.7	21.98	46.70	22.8	48.08	28.87
23.4	32.94	25.26	23.6	4.70	33.74	23.6	36.12	23.56	23.7	22.26	46.82	23.8	48.32	28.82
24.4	32.75	25.53	24.6	4.79	34.10	24.6	36.42	23.85	24.7	22.55	46.97	24.8	48.57	28.80
25.4	32.54	25.80	25.6	4.86	34.47	25.6	36.70	24.17	25.7	22.83	47.15	25.8	48.83	28.81
26.4	32.31	26.03	26.6	4.92	34.85	26.6	36.95	24.50	26.7	23.10	47.36	26.8	49.08	28.85
27.4	32.08	26.24	27.6	4.95	35.22	27.6	37.16	24.83	27.7	23.36	47.58	27.8	49.32	28.91
28.4	31.85	26.43	28.6	4.97	35.58	28.6	37.35	25.14	28.7	23.59	47.80	28.8	49.55	28.99
29.4	31.64	26.60	29.6	4.99	35.92	29.6	37.51	25.44	29.7	23.80	48.01	29.8	49.77	29.07
30.4	31.44	26.76	30.5	5.00	36.24	30.6	37.67	25.72	30.7	23.99	48.21	30.8	49.97	29.14
31.4	31.26	26.92	31.5	5.02	36.54	31.6	37.84	25.99	31.7	24.20	48.38	31.8	50.16	29.20
	11.97	−11.93		11.09	−11.04		18.43	−18.40		12.24	−12.20		9.77	−9.72
	$1^h\ 42^m$	$17^s.46$		$5^h\ 47^m$	$1^s.50$		$7^h\ 17^m$	$41^s.19$		$9^h\ 9^m$	$30^s.42$		$10^h\ 59^m$	$56^s.70$
	−85° 12′	33″.92		−84° 49′	51″.91		−86° 53′	40″.29		−85° 18′	58″.68		−84° 7′	33″.14

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis.			**31 Mensæ.**			**7 Octantis.**			**ζ Octantis.**			**η Octantis.**		
Mag. 5.6			Mag. 6.2			Mag. 6.4			Mag. 5.4			Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Dec.	1 42	−85 12	Dec.	5 47	−84 49	Dec.	7 17	−86 53	Dec.	9 9	−85 18	Dec.	10 59	−84 7
	s	″		s	″		s	″		s	″		s	″
1.4	31.26	26.92	1.5	5.02	36.54	1.6	37.84	25.99	1.7	24.20	48.38	1.8	50.16	29.20
2.4	31.09	27.09	2.5	5.05	36.83	2.6	38.01	26.25	2.7	24.41	48.55	2.8	50.36	29.24
3.4	30.92	27.28	3.5	5.09	37.13	3.6	38.20	26.50	3.7	24.62	48.71	3.8	50.56	29.27
4.4	30 74	27.47	4.5	5.13	37.44	4.6	38.40	26.77	4.7	24.84	48.87	4.8	50.77	29.30
5.4	30.55	27.67	5.5	5.18	37.76	5.6	38.62	27.05	5.7	25.07	49.05	5.8	50.99	29.33
6.4	30.35	27.89	6.5	5.23	38.09	6.6	38.84	27.34	6.7	25.32	49.24	6.7	51.22	29.37
7.4	30.13	28.10	7.5	5.27	38.44	7.6	39.05	27.65	7.7	25.57	49.45	7.7	51.46	29.42
8.4	29.90	28.31	8.5	5.30	38.82	8.6	39.26	27.98	8.7	25.82	49.68	8.7	51.71	29.49
9.4	29.65	28.51	9.5	5.32	39.22	9.6	39.45	28.33	9.7	26.07	49.92	9.7	51.96	29.59
10.4	29.39	28.68	10.5	5.31	39.60	10.6	39.62	28.69	10.7	26.30	50.19	10.7	52.20	29.72
11.3	29.13	28.84	11.5	5.29	39.98	11.6	39.76	29.05	11.7	26.53	50.48	11.7	52 44	29.85
12.3	28.86	28.96	12.5	5.25	40.35	12.6	39.87	29.42	12.7	26.73	50.77	12.7	52.67	30.00
13.3	28.60	29.07	13.5	5.20	40.71	13.6	39.94	29.78	13.7	26.91	51.07	13.7	52.89	30.17
14.3	28.35	29.16	14.5	5.15	41.04	14.6	40.00	30.12	14.6	27.07	51.35	14.7	53.10	30.34
15.3	28.12	29.25	15.5	5.10	41.35	15.6	40.05	30.45	15.6	27.23	51.62	15.7	53.29	30.50
16.3	27.91	29.33	16.5	5.05	41.64	16.6	40.12	30.75	16.6	27.39	51.87	16.7	53.47	30.64
17.3	27.69	29.41	17.5	5.01	41.94	17.6	40.19	31.04	17.6	27.55	52.11	17.7	53.66	30.77
18.3	27.48	29.52	18.5	4.99	42.25	18.6	40.27	31.33	18.6	27.72	52.34	18.7	53.85	30.91
19.3	27.26	29.64	19.5	4.97	42.57	19.6	40.39	31.64	19.6	27.90	52.59	19.7	54.05	31.02
20.3	27.03	29.77	20.5	4.95	42.91	20.6	40.51	31.97	20.6	28.09	52.85	20.7	54.27	31.15
21.3	26.78	29.91	21.5	4.92	43.27	21.6	40.63	32.33	21.6	28.30	53.14	21.7	54.51	31.29
22.3	26.51	30.04	22.5	4.88	43.65	22.6	40.72	32.72	22.6	28.51	53.46	22.7	54.76	31.46
23.3	26.21	30.15	23.5	4.81	44.05	23.5	40.80	33.12	23.6	28.70	53.80	23.7	55.00	31.67
24.3	25.91	30.22	24.5	4.72	44.44	24.5	40.83	33.52	24.6	28.88	54.16	24.7	55.22	31.91
25.3	25.62	30.26	25.5	4.61	44.81	25.5	40.83	33.92	25.6	29.04	54.52	25.7	55.43	32.16
26.3	25.33	30.29	26.5	4.49	45.15	26.5	40.80	34.30	26.6	29.17	54.87	26.7	55.63	32.40
27.3	25.04	30.29	27.5	4.38	45.47	27.5	40.76	34.66	27.6	29.29	55.22	27.7	55.81	32.64
28.3	24.80	30.30	28.5	4.27	45.77	28.5	40.72	35.00	28.6	29.39	55.54	28.7	55.98	32.88
29.3	24.55	30.31	29.5	4.17	46.05	29.5	40.68	35.32	29.6	29.49	55.84	29.7	56.15	33.10
30.3	24.31	30.31	30.5	4.07	46.33	30.5	40.66	35.64	30.6	29.60	56.13	30.7	56.32	33.30
31.3	24.07	30.34	31.5	3.99	46.63	31.5	40.65	35.95	31.6	29.72	56.41	31.7	56.49	33.50
32.3	23.83	30.38	32.5	3.91	46.93	32.5	40.66	36.28	32.6	29.85	56.70	32.7	56 67	33.71
	11.97	−11.93		11.09	−11.05		18.44	−18.42		12.24	−12.20		9.77	−9.72
	$1^h\ 42^m$	$17^s.46$		$5^h\ 47^m$	$1^s.50$		$7^h\ 17^m$	$41^s.19$		$9^h\ 9^m$	$30^s.42$		$10^h\ 59^m$	$56^s.70$
	−85° 12′	33″.92		−84° 49′	51″.91		−86° 53′	40″.29		−85° 18′	58″.68		−84° 7′	33″.14

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Jan.	12 45	-84 38	Jan.	14 12	-83 15	Jan.	18 3	-87 39	Jan.	19 19	-89 13	Jan.	22 15	-86 24
	s	″		s	″		s	″		s	″		s	″
0.8	36.67	44.65	0.8	41.77	59.63	0.9	14.88	58.55	1.0	50.15	69.43	1.1	14.09	60.42
1.7	36.96	44.71	1.8	41.99	59.53	1.9	15.10	58.19	2.0	50.20	69.03	2.1	13.81	60.14
2.7	37.26	44.81	2.8	42.24	59.47	2.9	15.37	57.83	3.0	50.38	68.63	3.1	13.55	59.84
3.7	37.55	44.94	3.8	42.49	59.45	3.9	15.68	57.48	4.0	50.67	68.23	4.1	13.32	59.53
4.7	37.82	45.08	4.8	42.73	59.46	4.9	16.01	57.15	5.0	51.07	67.85	5.1	13.11	59.21
5.7	38.08	45.23	5.8	42.95	59.48	5.9	16.35	56.84	6.0	51.55	67.50	6.1	12.93	58.90
6.7	38.34	45.39	6.8	43.16	59.52	6.9	16.69	56.56	7.0	52.05	67 16	7.1	12.76	58.59
7.7	38.57	45.55	7.8	43.37	59.55	7.9	17.02	56.30	8.0	52.54	66.83	8.1	12.61	58.29
8.7	38.80	45.70	8.8	43.57	59.58	8.9	17.35	56.04	9.0	53.02	66.52	9.1	12.47	58.02
9.7	39.01	45.85	9.8	43.76	59.61	9.9	17.67	55.78	10.0	53.45	66.22	10.1	12.32	57.75
10.7	39.23	45.98	10.8	43.95	59.64	10.9	17.97	55.52	10.9	53.84	65.91	11.1	12.16	57.49
11.7	39.46	46.10	11.8	44.14	59.65	11.9	18.26	55.25	11.9	54.19	65.60	12.1	12.00	57.22
12.7	39.70	46.22	12.8	44.34	59.66	12.9	18.54	54.97	12.9	54.51	65.28	13.1	11.81	56.95
13.7	39.94	46.34	13.8	44.54	59.66	13.9	18.82	54.67	13.9	54.82	64.94	14.1	11.61	56.66
14.7	40.19	46.47	14.8	44.76	59.66	14.9	19.14	54.36	14.9	55.18	64.58	15.1	11.40	56.36
15.7	40.45	46.63	15.8	44.99	59.67	15.9	19.48	54.04	15.9	55.61	64.19	16.1	11.20	56.04
16.7	40.73	46.79	16.8	45.24	59.69	16.9	19.87	53.71	16.9	56.16	63.81	17.1	11.01	55.68
17.7	41.01	46.99	17.8	45.49	59.74	17.9	20.30	53.39	17.9	56.85	63.42	18.1	10.84	55.31
18.7	41.27	47.22	18.8	45.73	59.83	18.9	20.77	53.09	18.9	57.70	63.04	19.1	10.69	54.93
19.7	41.53	47.47	19.8	45.96	59.93	19.9	21.26	52.82	19.9	58.65	62.67	20.1	10.58	54.54
20.7	41.76	47.73	20.8	46.19	60.06	20.9	21.77	52.56	20.9	59.67	62.33	21.1	10.52	54.17
21.7	41.97	47.99	21.8	46.41	60.21	21.9	22.26	52.34	21.9	60.68	62.03	22.1	10.46	53.82
22.7	42.17	48.24	22.8	46.61	60.35	22.9	22.74	52.13	22.9	61.66	61.74	23.1	10.40	53.48
23.7	42.36	48.47	23.8	46.80	60.48	23.9	23.18	51.92	23.9	62.57	61.46	24.1	10.34	53.16
24.7	42.55	48.69	24.7	46.99	60.58	24.9	23.58	51.72	24.9	63.38	61.18	25.1	10.26	52.85
25.7	42.76	48.88	25.7	47.19	60.68	25.9	23.98	51.49	25.9	64.12	60.87	26.1	10.15	52.55
26.7	42.97	49.08	26.7	47.39	60.74	26.9	24.38	51.24	26.9	64.81	60.55	27.1	10.02	52.22
27.7	43.20	49.28	27.7	47.61	60.81	27.9	24.79	50.97	27.9	65.52	60.22	28.1	9.88	51.88
28.7	43.46	49.51	28.7	47.83	60.90	28.9	25.24	50.68	28.9	66.33	59.86	29.1	9.75	51.51
29.7	43.71	49.75	29.7	48.07	61.01	29.9	25.73	50.39	29.9	67.26	59.49	30.1	9.62	51.12
30.7	43.97	50.01	30.7	48.31	61.14	30.9	26.25	50.11	30.9	68.32	59.12	31.1	9.53	50.71
31.7	44.20	50 29	31.7	48.54	61.28	31.9	26.81	49.85	31.9	69.47	58.77	32.1	9.47	50.30
32.7	44.42	50 59	32.7	48.77	61.45	32.9	27.37	49.63	32.9	70.70	58.43	33.1	9.42	49.90
	10.72	−10.67		8.53	−8.47		24.54	−24.52		74.85	−74.84		16.00	−15.96
	12h 45m	43s.33		14h 12m	50s.81		18h 3m	48s.95		19h 21m	19s.15		22h 15m	19s.18
	−84° 39′	3″.86		−83° 16′	13″.94		−87° 39′	53″.07		−89° 13′	57″.47		−86° 24′	39″.46

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Feb.	12 45	−84 38	Feb.	14 12	−83 16	Feb.	18 3	−87 39	Feb.	19 20	−89 13	Feb.	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.7	44.42	50.59	1.7	48.77	1.45	1.9	27.37	49.63	1.9	10.70	58.43	1.1	9.47	50.30
2.7	44.63	50.90	2.7	48.99	1.64	2.9	27.94	49.42	2.9	11.97	58.12	2.1	9.42	49.90
3.7	44.83	51.21	3.7	49.20	1.83	3.9	28.50	49.23	3.9	13.25	57.83	3.1	9.40	49.50
4.7	45.01	51.50	4.7	49.39	2.02	4.9	29.04	49.05	4.9	14.50	57.55	4.1	9.38	49.13
5.7	45.17	51.79	5.7	49.58	2.21	5.9	29.57	48.90	5.9	15.71	57.30	5.1	9.38	48.76
6.7	45.34	52.07	6.7	49.77	2.39	6.9	30.08	48.74	6.9	16.86	57.05	6.0	9.39	48.42
7.6	45.51	52.34	7.7	49.96	2.57	7.9	30.56	48.57	7.9	17.97	56.78	7.0	9.38	48.08
8.6	45.69	52.59	8.7	50.14	2.72	8.9	31.04	48.38	8.9	19.04	56.51	8.0	9.36	47.74
9.6	45.87	52.85	9.7	50.32	2.87	9.9	31.53	48.19	9.9	20.10	56.23	9.0	9.34	47.40
10.6	46.07	53.11	10.7	50.52	3.03	10.9	32.02	47.98	10.9	21.16	55.94	10.0	9.30	47.06
11.6	46.27	53.38	11.7	50.72	3.18	11.9	32.54	47.77	11.9	22.28	55.62	11.0	9.24	46.71
12.6	46.48	53.66	12.7	50.94	3.34	12.9	33.10	47.54	12.9	23.49	55.29	12.0	9.19	46.33
13.6	46.69	53.97	13.7	51.16	3.53	13.9	33.69	47.32	13.9	24.82	54.96	13.0	9.15	45.93
14.6	46.90	54.31	14.7	51.39	3.74	14.8	34.32	47.12	14.9	26.29	54.64	14.0	9.12	45.50
15.6	47.10	54.66	15.7	51.61	3.99	15.8	34.99	46.93	15.9	27.88	54.34	15.0	9.13	45.07
16.6	47.27	55.04	16.7	51.82	4.26	16.8	35.67	46.78	16.9	29.54	54.06	16.0	9.15	44.64
17.6	47.43	55.42	17.7	52.01	4.53	17.8	36.33	46.66	17.9	31.24	53.81	17.0	9.22	44.22
18.6	47.57	55.80	18.7	52.19	4.81	18.8	36.97	46.56	18.9	32.90	53.57	18.0	9.31	43.82
19.6	47.69	56.15	19.7	52.36	5.08	19.8	37.58	46.46	19.9	34.48	53.36	19.0	9.41	43.43
20.6	47.82	56.49	20.7	52.52	5.33	20.8	38.17	46.37	20.9	35.95	53.16	20.0	9.51	43.06
21.6	47.94	56.81	21.7	52.69	5.56	21.8	38.72	46.28	21.9	37.33	52.95	21.0	9.58	42.71
22.6	48.08	57.11	22.7	52.86	5.77	22.8	39.27	46.15	22.9	38.68	52.71	22.0	9.65	42.37
23.6	48.23	57.42	23.7	53.04	5.98	23.8	39.82	45.99	23.9	40.01	52.45	23.0	9.68	42.02
24.6	48.40	57.73	24.7	53.22	6.19	24.8	40.40	45.82	24.9	41.40	52.18	23.9	9.71	41.66
25.6	48.58	58.06	25.7	53.42	6.42	25.8	41.02	45.65	25.9	42.88	51.90	24.9	9.73	41.27
26.6	48.75	58.41	26.7	53.63	6.68	26.8	41.67	45.50	26.9	44.46	51.62	25.9	9.76	40.86
27.6	48.92	58.79	27.7	53.84	6.95	27.8	42.35	45.35	27.9	46.15	51.34	26.9	9.80	40.43
28.6	49.07	59.18	28.7	54.03	7.24	28.8	43.04	45.22	28.9	47.94	51.09	27.9	9.87	40.00
29.6	49.21	59.58	29.6	54.21	7.54	29.8	43.73	45.12	29.9	49.77	50.87	28.9	9.97	39.58
30.6	49.32	59.97	30.6	54.38	7.85	30.8	44.41	45.06	30.9	51.59	50.67	29.9	10.10	39.18
	10.72	−10.68		8.53	−8.47		24.52	−24.50		74.58	−74.58		15.98	−15.95
	$12^h\ 45^m$	$43^s.33$		$14^h\ 12^m$	$50^s.81$		$18^h\ 3^m$	$48^s.95$		$19^h\ 21^m$	$19^s.15$		$22^h\ 15^m$	$19^s.18$
	−84° 39′	3″.86		−83° 16′	13″.94		−87° 39′	53″.07		−89° 13′	57″.47		−86° 24′	39″.46

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Mar.	12 45	−84 38	Mar.	14 12	−83 16	Mar.	18 3	−87 39	Mar.	19 20	−89 13	Mar.	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.6	49.21	59.58	1.6	54.21	7.54	1.8	43.73	45.12	1.9	49.77	50.87	1.9	10.10	39.18
2.6	49.32	59.97	2.6	54.38	7.85	2.8	44.41	45.06	2.9	51.59	50.67	2.9	10.24	38.79
3.6	49.42	60.36	3.6	54.54	8.17	3.8	45.09	45.00	3.9	53.39	50.49	3.9	10.39	38.41
4.6	49.51	60.74	4.6	54.70	8.47	4.8	45.73	44.96	4.9	55.14	50.32	4.9	10.54	38.05
5.6	49.60	61.11	5.6	54.84	8.77	5.8	46.34	44.93	5.9	56.83	50.16	5.9	10.69	37.70
6.6	49.68	61.46	6.6	54.97	9.07	6.8	46.94	44.89	6.8	58.46	49.99	6.9	10.83	37.36
7.6	49.77	61.80	7.6	55.10	9.34	7.8	47.51	44.84	7.8	60.03	49.83	7.9	10.96	37.03
8.6	49.86	62.13	8.6	55.25	9.60	8.8	48.09	44.78	8.8	61.56	49.67	8.9	11.07	36.69
9.6	49.96	62.46	9.6	55.40	9.86	9.8	48.67	44.71	9.8	63.09	49.47	9.9	11.17	36.33
10.6	50.08	62.80	10.6	55.55	10.12	10.8	49.27	44.62	10.8	64.64	49.26	10.9	11.28	35.97
11.6	50.20	63.16	11.6	55.72	10.38	11.8	49.88	44.53	11.8	66.27	49.05	11.9	11.38	35.60
12.6	50.32	63.52	12.6	55.89	10.66	12.8	50.54	44.44	12.8	67.98	48.83	12.9	11.48	35.21
13.6	50.45	63.92	13.6	56.06	10.96	13.8	51.24	44.35	13.8	69.81	48.61	13.9	11.62	34.80
14.6	50.56	64.32	14.6	56.24	11.29	14.8	51.96	44.28	14.8	71.75	48.40	14.9	11.79	34.38
15.6	50.66	64.75	15.6	56.40	11.64	15.8	52.69	44.25	15.8	73.78	48.23	15.9	11.99	33.97
16.5	50.73	65.18	16.6	56.54	12.01	16.8	53.42	44.25	16.8	75.85	48.07	16.9	12.21	33.58
17.5	50.78	65.61	17.6	56.68	12.38	17.8	54.13	44.27	17.8	77.92	47.95	17.9	12.44	33.21
18.5	50.82	66.03	18.6	56.80	12.76	18.8	54.81	44.30	18.8	79.91	47.85	18.9	12.68	32.86
19.5	50.85	66.43	19.6	56.90	13.11	19.8	55.45	44.34	19.8	81.80	47.76	19.9	12.92	32.53
20.5	50.89	66.80	20.6	57.01	13.44	20.8	56.06	44.37	20.8	83.58	47.67	20.9	13.13	32.21
21.5	50.93	67.16	21.6	57.12	13.75	21.8	56.65	44.38	21.8	85.27	47.56	21.9	13.31	31.90
22.5	50.98	67.50	22.6	57.23	14.04	22.8	57.23	44.38	22.8	86.93	47.43	22.9	13.49	31.58
23.5	51.05	67.85	23.6	57.35	14.34	23.7	57.85	44.35	23.8	88.61	47.28	23.9	13.65	31.24
24.5	51.13	68.22	24.6	57.49	14.64	24.7	58.49	44.31	24.8	90.36	47.12	24.9	13.80	30.87
25.5	51.21	68.60	25.6	57.64	14.96	25.7	59.16	44.28	25.8	92.21	46.95	25.9	13.98	30.49
26.5	51.30	69.01	26.6	57.78	15.30	26.7	59.85	44.25	26.8	94.16	46.79	26.9	14.17	30.10
27.5	51.36	69.43	27.6	57.92	15.65	27.7	60.56	44.27	27.8	96.20	46.65	27.9	14.40	29.72
28.5	51.41	69.85	28.6	58.04	16.02	28.7	61.27	44.29	28.8	98.28	46.55	28.9	14.65	29.35
29.5	51.44	70.28	29.6	58.16	16.41	29.7	61.98	44.34	29.8	100.37	46.44	29.9	14.91	28.99
30.5	51.45	70.70	30.6	58.26	16.79	30.7	62.67	44.42	30.8	102.44	46.38	30.9	15.19	28.67
31.5	51.45	71.11	31.6	58.34	17.17	31.7	63.32	44.50	31.8	104.44	46.33	31.9	15.47	28.36
32.5	51.44	71.50	32.6	58.42	17.54	32.7	63.95	44.59	32.8	106.37	46.29	32.9	15.75	28.06
	10.73	−10.68		8.53	−8.47		24.52	−24.50		74.42	−74.41		15.97	−15.94
	$12^h\ 45^m$	$43^s.33$		$14^h\ 12^m$	$50^s.81$		$18^h\ 3^m$	$48^s.95$		$19^h\ 21^m$	$19^s.15$		$22^h\ 15^m$	$19^s.18$
	−84° 39′	3″.86		−83° 16′	13″.94		−87° 39′	53″.07		−89° 13′	57″.47		−86° 24′	39″.46

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Apr.	12 45	−84 39	Apr.	14 12	−83 16	Apr.	18 4	−87 39	Apr.	19 21	−89 13	Apr.	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.5	51.44	11.50	1.6	58.42	17.54	1.7	3.95	44.59	1.8	46.37	46.29	1.9	15.75	28.06
2.5	51.43	11.87	2.6	58.50	17.89	2.7	4.55	44.68	2.8	48.23	46.25	2.9	16.03	27.79
3.5	51.43	12.24	3.6	58.58	18.23	3.7	5.13	44.76	3.8	50.02	46.22	3.9	16.28	27.51
4.5	51.43	12.59	4.6	58.65	18.55	4.7	5.71	44.83	4.8	51.76	46.18	4.9	16.51	27.23
5.5	51.43	12.93	5.6	58.73	18.87	5.7	6.28	44.90	5.8	53.46	46.12	5.9	16.74	26.95
6.5	51.44	13.28	6.6	58.81	19.19	6.7	6.84	44.94	6.8	55.18	46.04	6.9	16.97	26.66
7.5	51.47	13.63	7.5	58.91	19.51	7.7	7.43	44.98	7.8	56.94	45.96	7.9	17.19	26.36
8.5	51.50	14.00	8.5	59.01	19.84	8.7	8.05	45.01	8.8	58.76	45.87	8.9	17.41	26.03
9.5	51.53	14.38	9.5	59.12	20.18	9.7	8.71	45.06	9.8	60.69	45.79	9.9	17.65	25.70
10.5	51.55	14.78	10.5	59.22	20.55	10.7	9.38	45.12	10.8	62.72	45.70	10.9	17.92	25.35
11.5	51.56	15.20	11.5	59.32	20.93	11.7	10.07	45.21	11.8	64.83	45.64	11.9	18.23	25.02
12.5	51.54	15.63	12.5	59.40	21.34	12.7	10.76	45.31	12.7	67.01	45.61	12.9	18.55	24.70
13.5	51.50	16.05	13.5	59.46	21.76	13.7	11.44	45.46	13.7	69.17	45.62	13.9	18.90	24.40
14.5	51.45	16.47	14.5	59.52	22.18	14.7	12.08	45.61	14.7	71.26	45.64	14.9	19.25	24.13
15.5	51.39	16.85	15.5	59.55	22.57	15.7	12.69	45.78	15.7	73.25	45.67	15.9	19.59	23.88
16.5	51.33	17.21	16.5	59.58	22.94	16.7	13.25	45.94	16.7	75.12	45.71	16.9	19.91	23.64
17.5	51.27	17.55	17.5	59.62	23.29	17.7	13.79	46.08	17.7	76.87	45.74	17.9	20.21	23.42
18.5	51.23	17.88	18.5	59.66	23.62	18.7	14.32	46.21	18.7	78.58	45.75	18.9	20.48	23.19
19.5	51.20	18.21	19.5	59.71	23.94	19.7	14.85	46.31	19.7	80.27	45.74	19.8	20.75	22.94
20.5	51.18	18.55	20.5	59.77	24.26	20.7	15.42	46.40	20.7	82.01	45.71	20.8	21.01	22.69
21.4	51.17	18.91	21.5	59.84	24.59	21.7	16.00	46.49	21.7	83.83	45.68	21.8	21.28	22.41
22.4	51.16	19.28	22.5	59.91	24.95	22.7	16.61	46.59	22.7	85.75	45.65	22.8	21.57	22.12
23.4	51.13	19.66	23.5	59.98	25.33	23.7	17.25	46.72	23.7	87.75	45.63	23.8	21.88	21.83
24.4	51.10	20.06	24.5	60.04	25.72	24.7	17.89	46.85	24.7	89.79	45.64	24.8	22.21	21.55
25.4	51.04	20.46	25.5	60.09	26.12	25.7	18.52	47.01	25.7	91.86	45.66	25.8	22.56	21.29
26.4	50.96	20.85	26.5	60.11	26.52	26.7	19.13	47.20	26.7	93.88	45.72	26.8	22.93	21.05
27.4	50.87	21.22	27.5	60.13	26.91	27.7	19.70	47.41	27.7	95.86	45.81	27.8	23.31	20.83
28.4	50.77	21.57	28.5	60.14	27.29	28.7	20.25	47.62	28.7	97.75	45.90	28.8	23.68	20.63
29.4	50.67	21.92	29.5	60.14	27.66	29.6	20.77	47.83	29.7	99.57	45.99	29.8	24.04	20.45
30.4	50.57	22.24	30.5	60.14	28.01	30.6	21.27	48.03	30.7	101.32	46.09	30.8	24.38	20.28
31.4	50.48	22.56	31.5	60.14	28.35	31.6	21.74	48.23	31.7	102.98	46.19	31.8	24.72	20.12
10.74		−10.69	8.54		−8.48	24.52		−24.50	74.35		−74.34	15.96		−15.92
12^{h} 45^{m}		$43^{s}.33$	14^{h} 12^{m}		$50^{s}.81$	18^{h} 3^{m}		$48^{s}.95$	19^{h} 21^{m}		$19^{s}.15$	22^{h} 15^{m}		$19^{s}.18$
−84° 39′		3″.86	−83° 16′		13″.94	−87° 39′		53″.07	−89° 13′		57″.47	−86° 24′		39″.46

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
May	12 45	−84 39	May	14 12	−83 16	May	18 4	−87 39	May	19 22	−89 13	May	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.4	50.48	22.56	1.5	60.14	28.35	1.6	21.74	48.23	1.7	42.98	46.19	1.8	24.72	20.12
2.4	50.39	22.85	2.5	60.14	28.67	2.6	22.20	48.42	2.7	44.60	46.27	2.8	25.03	19.95
3.4	50.31	23.14	3.5	60.15	28.99	3.6	22.67	48.59	3.7	46.18	46.34	3.8	25.34	19.78
4.4	50.24	23.44	4.5	60.17	29.31	4.6	23.15	48.75	4.7	47.78	46.39	4.8	25.64	19.59
5.4	50.18	23.75	5.5	60.20	29.62	5.6	23.63	48.89	5.7	49.43	46.43	5.8	25.94	19.39
6.4	50.12	24.07	6.5	60.22	29.95	6.6	24.15	49.05	6.7	51.17	46.47	6.8	26.25	19.17
7.4	50.05	24.41	7.5	60.25	30.30	7.6	24.70	49.21	7.7	52.99	46.52	7.8	26.58	18.95
8.4	49.97	24.76	8.5	60.27	30.67	8.6	25.27	49.40	8.7	54.91	46.59	8.8	26.93	18.73
9.4	49.88	25.13	9.5	60.28	31.06	9.6	25.84	49.60	9.7	56.88	46.68	9.8	27.32	18.51
10.4	49.76	25.50	10.5	60.27	31.46	10.6	26.39	49.84	10.7	58.86	46.78	10.8	27.74	18.33
11.4	49.63	25.85	11.5	60.25	31.86	11.6	26.91	50.10	11.7	60.78	46.94	11.8	28.16	18.17
12.4	49.48	26.18	12.5	60.22	32.24	12.6	27.39	50.38	12.7	62.59	47.11	12.8	28.56	18.04
13.4	49.33	26.47	13.4	60.17	32.60	13.6	27.84	50.65	13.7	64.28	47.28	13.8	28.96	17.93
14.4	49.18	26.74	14.4	60.13	32.92	14.6	28.23	50.91	14.7	65.85	47.44	14.8	29.33	17.82
15.4	49.05	27.00	15.4	60.09	33.23	15.6	28.61	51.15	15.7	67.32	47.58	15.8	29.67	17.73
16.4	48.94	27.25	16.4	60.06	33.52	16.6	28.98	51.37	16.7	68.75	47.72	16.8	29.99	17.62
17.4	48.84	27.51	17.4	60.04	33.81	17.6	29.38	51.57	17.7	70.20	47.83	17.8	30.30	17.49
18.4	48.74	27.78	18.4	60.03	34.10	18.6	29.79	51.76	18.7	71.70	47.92	18.8	30.61	17.34
19.4	48.65	28.06	19.4	60.03	34.41	19.6	30.25	51.95	19.6	73.29	48.02	19.8	30.94	17.19
20.4	48.55	28.36	20.4	60.03	34.75	20.6	30.72	52.15	20.6	74.96	48.12	20.8	31.30	17.04
21.4	48.43	28.67	21.4	60.01	35.09	21.6	31.20	52.38	21.6	76.69	48.23	21.8	31.67	16.88
22.4	48.30	28.98	22.4	59.98	35.45	22.6	31.66	52.63	22.6	78.46	48.38	22.8	32.07	16.74
23.4	48.15	29.28	23.4	59.94	35.81	23.6	32.11	52.90	23.6	80.20	48.55	23.8	32.47	16.63
24.4	47.98	29.57	24.4	59.89	36.16	24.6	32.54	53.19	24.6	81.87	48.74	24.8	32.89	16.54
25.4	47.81	29.84	25.4	59.82	36.50	25.6	32.92	53.49	25.6	83.45	48.94	25.8	33.30	16.47
26.4	47.63	30.09	26.4	59.75	36.83	26.6	33.27	53.79	26.6	84.94	49.16	26.7	33.70	16.42
27.4	47.45	30.32	27.4	59.67	37.14	27.6	33.60	54.09	27.6	86.33	49.38	27.7	34.08	16.39
28.3	47.28	30.55	28.4	59.59	37.43	28.6	33.89	54.38	28.6	87.63	49.59	28.7	34.46	16.36
29.3	47.12	30.75	29.4	59.52	37.69	29.6	34.17	54.65	29.6	88.87	49.80	29.7	34.81	16.33
30.3	46.97	30.94	30.4	59.45	37.95	30.6	34.44	54.91	30.6	90.07	50.00	30.7	35.14	16.30
31.3	46.82	31.13	31.4	59.39	38.21	31.6	34.73	55.16	31.6	91.27	50.18	31.7	35.47	16.25
32.3	46.68	31.32	32.4	59.34	38.46	32.6	35.02	55.39	32.6	92.50	50.35	32.7	35.79	16.20
	10.74	−10.69		8.54	−8.48		24.54	−24.52		74.40	−74.39		15.95	−15.92
	$12^{h}\ 45^{m}$	$43^{s}.33$		$14^{h}\ 12^{m}$	$50^{s}.81$		$18^{h}\ 3^{m}$	$48^{s}.95$		$19^{h}\ 21^{m}$	$19^{s}.15$		$22^{h}\ 15^{m}$	$19^{s}.18$
	−84° 39′	3″.86		−83° 16′	13″.94		−87° 39′	53″.07		−89° 13′	57″.47		−86° 24′	39″.46

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
June	12 45	−84 39	June	14 12	−83 16	June	18 4	−87 39	June	19 23	−89 13	June	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.3	46.68	31.32	1.4	59.34	38.46	1.6	35.02	55.39	1.6	32.50	50.35	1.7	35.79	16.20
2.3	46.55	31.53	2.4	59.29	38.73	2.6	35.33	55.63	2.6	33.80	50.51	2.7	36.12	16.12
3.3	46.42	31.76	3.4	59.24	39.01	3.6	35.67	55.87	3.6	35.16	50.66	3.7	36.46	16.04
4.3	46.28	32.00	4.4	59.20	39.31	4.6	36.03	56.12	4.6	36.60	50.83	4.7	36.82	15.96
5.3	46.12	32.26	5.4	59.14	39.63	5.5	36.40	56.39	5.6	38.11	51.02	5.7	37.20	15.89
6.3	45.95	32.51	6.4	59.06	39.96	6.5	36.76	56.68	6.6	39.65	51.23	6.7	37.62	15.84
7.3	45.76	32.75	7.4	58.98	40.29	7.5	37.09	57.01	7.6	41.13	51.48	7.7	38.04	15.81
8.3	45.55	32.98	8.4	58.88	40.60	8.5	37.39	57.35	8.6	42.52	51.74	8.7	38.46	15.81
9.3	45.33	33.17	9.4	58.77	40.90	9.5	37.64	57.70	9.6	43.78	52.02	9.7	38.87	15.83
10.3	45.11	33.35	10.4	58.65	41.16	10.5	37.84	58.03	10.6	44.90	52.30	10.7	39.24	15.88
11.3	44.91	33.49	11.4	58.54	41.39	11.5	38.01	58.34	11.6	45.89	52.56	11.7	39.60	15.94
12.3	44.73	33.62	12.4	58.44	41.61	12.5	38.17	58.63	12.6	46.81	52.81	12.7	39.92	15.98
13.3	44.56	33.75	13.4	58.35	41.81	13.5	38.33	58.90	13.6	47.72	53.03	13.7	40.24	16.00
14.3	44.40	33.87	14.4	58.27	42.02	14.5	38.52	59.15	14.6	48.66	53.24	14.7	40.54	16.01
15.3	44.24	34.02	15.4	58.20	42.24	15.5	38.74	59.40	15.6	49.67	53.43	15.7	40.85	16.01
16.3	44.09	34.19	16.4	58.13	42.47	16.5	38.98	59.66	16.6	50.77	53.63	16.7	41.18	16.00
17.3	43.93	34.36	17.4	58.05	42.73	17.5	39.23	59.94	17.6	51.94	53.84	17.7	41.53	15.99
18.3	43.75	34.54	18.4	57.95	42.99	18.5	39.47	60.23	18.6	53.13	54.07	18.7	41.89	15.99
19.3	43.56	34.72	19.3	57.85	43.26	19.5	39.68	60.55	19.6	54.30	54.33	19.7	42.28	16.03
20.3	43.35	34.89	20.3	57.73	43.52	20.5	39.89	60.88	20.6	55.42	54.61	20.7	42.68	16.07
21.3	43.14	35.04	21.3	57.61	43.78	21.5	40.06	61.23	21.6	56.47	54.91	21.7	43.06	16.14
22.3	42.91	35.16	22.3	57.47	44.02	22.5	40.18	61.57	22.6	57.42	55.21	22.7	43.44	16.23
23.3	42.67	35.26	23.3	57.33	44.23	23.5	40.28	61.92	23.6	58.25	55.52	23.7	43.79	16.34
24.3	42.45	35.35	24.3	57.19	44.42	24.5	40.35	62.25	24.6	58.97	55.83	24.7	44.14	16.46
25.3	42.24	35.42	25.3	57.05	44.60	25.5	40.40	62.57	25.5	59.62	56.12	25.7	44.47	16.58
26.3	42.03	35.48	26.3	56.92	44.75	26.5	40.44	62.86	26.5	60.21	56.40	26.7	44.76	16.71
27.3	41.84	35.53	27.3	56.80	44.90	27.5	40.47	63.15	27.5	60.77	56.66	27.7	45.05	16.81
28.3	41.66	35.58	28.3	56.68	45.05	28.5	40.51	63.41	28.5	61.34	56.91	28.7	45.33	16.91
29.3	41.48	35.64	29.3	56.57	45.20	29.5	40.56	63.67	29.5	61.95	57.16	29.7	45.62	16.99
30.3	41.30	35.72	30.3	56.46	45.36	30.5	40.66	63.93	30.5	62.63	57.39	30.7	45.90	17.05
31.3	41.14	35.81	31.3	56.36	45.54	31.5	40.77	64.20	31.5	63.39	57.62	31.7	46.21	17.12
	10.74	−10.70		8.54	−8.48		24.56	−24.54		74.56	−74.55		15.95	−15.91
	$12^{h}\ 45^{m}$	$43^{s}.33$		$14^{h}\ 12^{m}$	$50^{s}.81$		$18^{h}\ 3^{m}$	$48^{s}.95$		$19^{h}\ 21^{m}$	$19^{s}.15$		$22^{h}\ 15^{m}$	$19^{s}.18$
	−84° 39′	3″.86		−83° 16′	13″.94		−87° 39′	53″.07		−89° 13′	57″.47		−86° 24′	39″.46

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis.			**δ Octantis.**			**χ Octantis.**			**σ Octantis.**			**υ Octantis.**		
Mag. 5.4			Mag. 4.1			Mag. 5.2			Mag. 5.5			Mag. 5.7		
Mean Solar Date.	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
July	12 45	−84 39	July	14 12	−83 16	July	18 4	−87 40	July	19 24	−89 13	July	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.3	41.14	35.81	1.3	56.36	45.54	1.5	40.77	4.20	1.5	3.39	57.62	1.7	46.21	17.12
2.3	40.95	35.92	2.3	56.25	45.73	2.5	40.89	4.50	2.5	4.21	57.88	2.6	46.54	17.20
3.3	40.75	36.03	3.3	56.12	45.94	3.5	41.01	4.81	3.5	5.07	58.16	3.6	46.89	17.28
4.2	40.53	36.14	4.3	55.98	46.15	4.5	41.10	5.15	4.5	5.91	58.46	4.6	47.25	17.39
5.2	40.29	36.24	5.3	55.82	46.36	5.5	41.17	5.51	5.5	6.69	58.79	5.6	47.62	17.51
6.2	40.04	36.29	6.3	55.66	46.55	6.5	41.18	5.86	6.5	7.32	59.13	6.6	47.97	17.68
7.2	39.80	36.33	7.3	55.49	46.70	7.5	41.15	6.21	7.5	7.81	59.47	7.6	48.31	17.85
8.2	39.57	36.32	8.3	55.33	46.83	8.5	41.07	6.54	8.5	8.15	59.79	8.6	48.61	18.04
9.2	39.35	36.31	9.3	55.17	46.92	9.5	40.98	6.85	9.5	8.37	60.11	9.6	48.88	18.23
10.2	39.14	36.29	10.3	55.03	47.01	10.5	40.90	7.13	10.5	8.56	60.39	10.6	49.13	18.41
11.2	38.96	36.26	11.3	54.89	47.08	11.4	40.82	7.39	11.5	8.76	60.66	11.6	49.37	18.58
12.2	38.79	36.25	12.3	54.77	47.16	12.4	40.76	7.64	12.5	9.03	60.91	12.6	49.59	18.72
13.2	38.62	36.25	13.3	54.65	47.26	13.4	40.73	7.89	13.5	9.35	61.16	13.6	49.84	18.85
14.2	38.44	36.28	14.3	54.52	47.38	14.4	40.71	8.15	14.5	9.75	61.42	14.6	50.09	18.98
15.2	38.25	36.31	15.3	54.39	47.50	15.4	40.70	8.44	15.5	10.20	61.69	15.6	50.37	19.11
16.2	38.05	36.33	16.3	54.25	47.63	16.4	40.68	8.75	16.5	10.65	61.99	16.6	50.66	19.25
17.2	37.84	36.34	17.3	54.10	47.76	17.4	40.65	9.06	17.5	11.06	62.30	17.6	50.96	19.43
18.2	37.60	36.35	18.3	53.93	47.89	18.4	40.57	9.39	18.5	11.37	62.63	18.6	51.26	19.62
19.2	37.36	36.33	19.3	53.76	48.00	19.4	40.45	9.73	19.5	11.59	62.97	19.6	51.55	19.83
20.2	37.12	36.28	20.3	53.58	48.07	20.4	40.30	10.06	20.5	11.70	63.32	20.6	51.83	20.07
21.2	36.89	36.22	21.3	53.40	48.13	21.4	40.13	10.38	21.5	11.71	63.66	21.6	52.08	20.31
22.2	36.67	36.13	22.3	53.22	48.18	22.4	39.92	10.67	22.5	11.62	63.99	22.6	52.32	20.56
23.2	36.45	36.04	23.3	53.05	48.20	23.4	39.71	10.95	23.5	11.46	64.31	23.6	52.52	20.81
24.2	36.26	35.94	24.3	52.89	48.21	24.4	39.48	11.21	24.5	11.25	64.61	24.6	52.72	21.05
25.2	36.07	35.84	25.3	52.73	48.21	25.4	39.25	11.46	25.5	11.04	64.88	25.6	52.90	21.28
26.2	35.90	35.74	26.2	52.58	48.22	26.4	39.05	11.69	26.5	10.85	65.14	26.6	53.07	21.49
27.2	35.73	35.66	27.2	52.44	48.23	27.4	38.88	11.92	27.5	10.73	65.40	27.6	53.25	21.69
28.2	35.56	35.59	28.2	52.31	48.26	28.4	38.73	12.15	28.5	10.68	65.65	28.6	53.44	21.88
29.2	35.40	35.54	29.2	52.17	48.29	29.4	38.58	12.40	29.5	10.69	65.92	29.6	53.64	22.06
30.2	35.20	35.50	30.2	52.03	48.35	30.4	38.45	12.67	30.5	10.75	66.20	30.6	53.86	22.26
31.2	35.00	35.45	31.2	51.88	48.41	31.4	38.31	12.95	31.4	10.82	66.51	31.6	54.10	22.47
32.2	34.78	35.39	32.2	51.70	48.47	32.4	38.14	13.25	32.4	10.83	66.83	32.6	54.34	22.70
	10.75	−10.70		8.54	−8.49		24.59	−24.57		74.78	−74.77		15.95	−15.92
	$12^{h}\ 45^{m}$	$43^{s}.33$		$14^{h}\ 12^{m}$	$50^{s}.81$		$18^{h}\ 3^{m}$	$48^{s}.95$		$19^{h}\ 21^{m}$	$19^{s}.15$		$22^{h}\ 15^{m}$	$19^{s}.18$
	−84° 39′	3″.86		−83° 16′	13″.94		−87° 39′	53″.07		−89° 13′	57″.47		−86° 24′	39″.46

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Aug.	12 45	−84 39	Aug.	14 12	−83 16	Aug.	18 4	−87 40	Aug.	19 23	−89 14	Aug.	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.2	34.78	35.39	1.2	51.70	48.47	1.4	38.14	13.25	1.4	70.83	6.83	1.6	54.34	22.70
2.2	34.55	35.31	2.2	51.52	48.51	2.4	37.92	13.57	2.4	70.73	7.17	2.6	54.58	22.95
3.2	34.32	35.20	3.2	51.34	48.54	3.4	37.67	13.87	3.4	70.49	7.51	3.6	54.80	23.23
4.2	34.10	35.06	4.2	51.16	48.53	4.4	37.37	14.15	4.4	70.11	7.84	4.6	54.99	23.53
5.2	33.89	34.89	5.2	50.97	48.48	5.4	37.05	14.41	5.4	69.61	8.15	5.6	55.15	23.82
6.2	33.70	34.72	6.2	50.79	48.42	6.4	36.71	14.63	6.4	69.04	8.44	6.6	55.27	24.10
7.2	33.53	34.55	7.2	50.64	48.35	7.4	36.38	14.84	7.4	68.43	8.70	7.5	55.38	24.37
8.2	33.38	34.39	8.2	50.49	48.28	8.4	36.08	15.02	8.4	67.87	8.94	8.5	55.48	24.62
9.1	33.24	34.24	9.2	50.36	48.21	9.4	35.81	15.20	9.4	67.39	9.17	9.5	55.57	24.86
10.1	33.10	34.10	10.2	50.23	48.16	10.4	35.55	15.39	10.4	66.97	9.40	10.5	55.69	25.08
11.1	32.94	33.97	11.2	50.10	48.12	11.4	35.30	15.60	11.4	66.61	9.65	11.5	55.82	25.31
12.1	32.77	33.84	12.2	49.95	48.11	12.4	35.04	15.83	12.4	66.26	9.92	12.5	55.97	25.54
13.1	32.60	33.73	13.2	49.79	48.09	13.4	34.78	16.07	13.4	65.89	10.21	13.5	56.13	25.80
14.1	32.40	33.59	14.2	49.62	48.06	14.4	34.49	16.31	14.4	65.46	10.50	14.5	56.28	26.08
15.1	32.20	33.43	15.2	49.45	48.02	15.4	34.16	16.57	15.4	64.94	10.81	15.5	56.44	26.38
16.1	32.00	33.25	16.2	49.27	47.95	16.4	33.80	16.82	16.4	64.31	11.13	16.5	56.57	26.69
17.1	31.82	33.05	17.2	49.08	47.87	17.3	33.41	17.05	17.4	63.58	11.44	17.5	56.69	27.01
18.1	31.64	32.84	18.2	48.90	47.77	18.3	33.00	17.27	18.4	62.74	11.74	18.5	56.78	27.34
19.1	31.46	32.60	19.2	48.73	47.64	19.3	32.56	17.47	19.4	61.82	12.02	19.5	56.84	27.68
20.1	31.30	32.36	20.2	48.56	47.50	20.3	32.12	17.64	20.4	60.86	12.28	20.5	56.88	28.00
21.1	31.16	32.11	21.2	48.41	47.35	21.3	31.68	17.80	21.4	59.88	12.52	21.5	56.91	28.30
22.1	31.04	31.88	22.2	48.27	47.20	22.3	31.26	17.94	22.4	58.90	12.74	22.5	56.93	28.59
23.1	30.92	31.65	23.2	48.14	47.05	23.3	30.87	18.08	23.4	57.97	12.95	23.5	56.95	28.87
24.1	30.80	31.43	24.2	48.01	46.91	24.3	30.50	18.20	24.4	57.13	13.14	24.5	56.97	29.12
25.1	30.68	31.24	25.2	47.89	46.78	25.3	30.15	18.34	25.4	56.36	13.35	25.5	57.01	29.37
26.1	30.56	31.05	26.2	47.77	46.69	26.3	29.81	18.49	26.4	55.66	13.56	26.5	57.06	29.62
27.1	30.42	30.88	27.2	47.63	46.61	27.3	29.49	18.66	27.4	54.99	13.80	27.5	57.13	29.89
28.1	30.27	30.69	28.2	47.48	46.52	28.3	29.13	18.84	28.4	54.28	14.06	28.5	57.21	30.18
29.1	30.11	30.49	29.2	47.33	46.41	29.3	28.75	19.04	29.4	53.49	14.33	29.5	57.29	30.47
30.1	29.94	30.27	30.2	47.16	46.29	30.3	28.31	19.23	30.4	52.60	14.60	30.5	57.35	30.78
31.1	29.79	30.03	31.1	47.00	46.14	31.3	27.85	19.42	31.4	51.56	14.86	31.5	57.39	31.12
32.1	29.64	29.76	32.1	46.83	45.96	32.3	27.35	19.58	32.4	50.39	15.11	32.5	57.39	31.45
	10.74	−10.70		8.55	−8.49		24.61	−24.59		75.03	−75.02		15.96	−15.93
	12^h 45^m	$43^s.33$		14^h 12^m	$50^s.81$		18^h 3^m	$48^s.95$		19^h 21^m	$19^s.15$		22^h 15^m	$19^s.18$
	−84° 39′	3″.86		−83° 16′	13″.94		−87° 39′	53″.07		−89° 13′	57″.47		−86° 24′	39″.46

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	**Right Ascension.**	**Declination** *South.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *South.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *South.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *South.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Sept.	12 45	−84 39	Sept.	14 12	−83 16	Sept.	18 4	−87 40	Sept.	19 23	−89 14	Sept.	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.1	29.64	29.76	1.1	46.83	45.96	1.3	27.35	19.58	1.4	50.39	15.11	1.5	57.39	31.45
2.1	29.52	29.49	2.1	46.68	45.77	2.3	26.85	19.70	2.4	49.12	15.33	2.5	57.36	31.79
3.1	29.42	29.18	3.1	46.54	45.55	3.3	26.34	19.79	3.4	47.82	15.52	3.5	57.30	32.10
4.1	29.34	28.89	4.1	46.42	45.33	4.3	25.86	19.87	4.4	46.56	15.68	4.5	57.23	32.38
5.1	29.27	28.63	5.1	46.32	45.13	5.3	25.42	19.92	5.4	45.36	15.83	5.5	57.15	32.65
6.1	29.19	28.38	6.1	46.22	44.93	6.3	25.00	19.98	6.3	44.23	15.97	6.5	57.09	32.90
7.1	29.11	28.15	7.1	46.12	44.75	7.3	24.60	20.04	7.3	43.18	16.12	7.5	57.05	33.15
8.1	29.03	27.92	8.1	46.01	44.58	8.3	24.20	20.13	8.3	42.20	16.28	8.5	57.02	33.40
9.1	28.94	27.69	9.1	45.89	44.42	9.3	23.79	20.23	9.3	41.20	16.46	9.5	57.01	33.68
10.1	28.84	27.45	10.1	45.76	44.26	10.3	23.36	20.34	10.3	40.16	16.66	10.5	56.99	33.96
11.1	28.72	27.20	11.1	45.63	44.08	11.3	22.92	20.46	11.3	39.03	16.86	11.5	56.97	34.27
12.1	28.61	26.92	12.1	45.49	43.90	12.3	22.45	20.57	12.3	37.80	17.08	12.5	56.94	34.59
13.1	28.50	26.63	13.1	45.35	43.68	13.3	21.92	20.68	13.3	36.46	17.28	13.4	56.88	34.92
14.1	28.40	26.33	14.1	45.22	43.45	14.3	21.38	20.77	14.3	35.05	17.48	14.4	56.81	35.25
15.0	28.31	26.01	15.1	45.09	43.21	15.3	20.83	20.83	15.3	33.57	17.66	15.4	56.70	35.59
16.0	28.25	25.68	16.1	44.96	42.94	16.3	20.27	20.87	16.3	32.02	17.82	16.4	56.59	35.91
17.0	28.19	25.34	17.1	44.86	42.66	17.3	19.73	20.90	17.3	30.46	17.95	17.4	56.45	36.21
18.0	28.15	25.02	18.1	44.76	42.37	18.3	19.19	20.90	18.3	28.91	18.07	18.4	56.29	36.50
19.0	28.13	24.70	19.1	44.68	42.10	19.3	18.68	20.89	19.3	27.41	18.16	19.4	56.13	36.76
20.0	28.11	24.40	20.1	44.60	41.83	20.3	18.19	20.86	20.3	25.98	18.24	20.4	55.97	37.01
21.0	28.09	24.12	21.1	44.52	41.59	21.3	17.74	20.84	21.3	24.63	18.32	21.4	55.83	37.25
22.0	28.07	23.86	22.1	44.45	41.37	22.2	17.31	20.84	22.3	23.37	18.40	22.4	55.71	37.49
23.0	28.04	23.60	23.1	44.38	41.15	23.2	16.89	20.85	23.3	22.17	18.50	23.4	55.60	37.72
24.0	28.00	23.34	24.1	44.29	40.94	24.2	16.47	20.88	24.3	20.98	18.62	24.4	55.51	37.96
25.0	27.94	23.08	25.1	44.20	40.73	25.2	16.02	20.92	25.3	19.73	18.74	25.4	55.41	38.24
26.0	27.88	22.80	26.1	44.10	40.51	26.2	15.53	20.96	26.3	18.40	18.88	26.4	55.31	38.54
27.0	27.82	22.50	27.1	43.99	40.27	27.2	15.02	20.98	27.3	16.94	19.02	27.4	55.19	38.83
28.0	27.78	22.18	28.1	43.90	39.99	28.2	14.48	20.99	28.3	15.35	19.15	28.4	55.03	39.13
29.0	27.76	21.83	29.1	43.81	39.69	29.2	13.91	20.97	29.3	13.67	19.23	29.4	54.84	39.43
30.0	27.75	21.48	30.1	43.74	39.39	30.2	13.35	20.92	30.3	11.96	19.29	30.4	54.62	39.71
31.0	27.77	21.15	31.1	43.68	39.06	31.2	12.82	20.83	31.3	10.29	19.32	31.4	54.39	39.96
	10.74	−10.69		8.54	−8.49		24.62	−24.60		75.22	−75.21		15.97	−15.94
	$12^h\ 45^m$	$43^s.33$		$14^h\ 12^m$	$50^s.81$		$18^h\ 3^m$	$48^s.95$		$19^h\ 21^m$	$19^s.15$		$22^h\ 15^m$	$19^s.18$
	−84° 39′	3″.86		−83° 16′	13″.94		−87° 39′	53″.07		−89° 13′	57″.47		−86° 24′	39″.46

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	**Right Ascension.**	**Declination** ***South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***South.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Oct.	12 45	−84 39	Oct.	14 12	−83 16	Oct.	18 3	−87 40	Oct.	19 22	−89 14	Oct.	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.0	27.77	21.15	1.1	43.68	39.06	1.2	72.82	20.83	1.3	70.29	19.32	1.4	54.39	39.96
2.0	27.80	20.83	2.1	43.64	38.75	2.2	72.32	20.73	2.3	68.70	19.33	2.4	54.15	40.18
2.9	27.84	20.53	3.1	43.61	38.45	3.2	71.86	20.63	3.3	67.17	19.33	3.4	53.92	40.39
3.9	27.88	20.24	4.1	43.58	38.18	4.2	71.42	20.54	4.3	65.73	19.34	4.4	53.71	40.58
4.9	27.93	19.97	5.1	43.55	37.92	5.2	71.00	20.45	5.3	64.38	19.34	5.4	53.52	40.78
5.9	27.95	19.71	6.1	43.52	37.66	6.2	70.59	20.38	6.3	63.06	19.37	6.4	53.34	40.98
6.9	27.97	19.45	7.0	43.47	37.41	7.2	70.17	20.33	7.3	61.73	19.41	7.4	53.16	41.20
7.9	27.98	19.18	8.0	43.42	37.16	8.2	69.72	20.29	8.3	60.35	19.46	8.4	52.99	41.43
8.9	27.99	18.89	9.0	43.36	36.89	9.2	69.24	20.24	9.3	58.88	19.52	9.4	52.81	41.68
9.9	28.00	18.58	10.0	43.29	36.62	10.2	68.74	20.18	10.3	57.32	19.57	10.4	52.60	41.93
10.9	28.01	18.26	11.0	43.24	36.31	11.2	68.22	20.11	11.3	55.68	19.61	11.4	52.38	42.19
11.9	28.02	17.92	12.0	43.19	35.99	12.2	67.69	20.02	12.2	53.98	19.64	12.4	52.14	42.44
12.9	28.07	17.58	13.0	43.15	35.67	13.2	67.16	19.91	13.2	52.24	19.64	13.4	51.87	42.67
13.9	28.12	17.24	14.0	43.13	35.32	14.2	66.64	19.78	14.2	50.48	19.62	14.4	51.58	42.90
14.9	28.20	16.90	15.0	43.11	34.98	15.2	66.12	19.63	15.2	48.73	19.59	15.4	51.29	43.11
15.9	28.28	16.58	16.0	43.10	34.64	16.2	65.63	19.45	16.2	47.04	19.52	16.4	50.98	43.29
16.9	28.38	16.28	17.0	43.11	34.31	17.2	65.18	19.27	17.2	45.43	19.44	17.4	50.68	43.46
17.9	28.49	15.99	18.0	43.13	34.01	18.2	64.77	19.09	18.2	43.92	19.35	18.4	50.39	43.60
18.9	28.60	15.73	19.0	43.15	33.72	19.2	64.38	18.91	19.2	42.50	19.27	19.4	50.12	43.74
19.9	28.69	15.48	20.0	43.17	33.44	20.2	64.01	18.76	20.2	41.16	19.19	20.3	49.86	43.87
20.9	28.77	15.25	21.0	43.18	33.18	21.2	63.65	18.62	21.2	39.86	19.13	21.3	49.64	44.00
21.9	28.85	15.02	22.0	43.18	32.93	22.2	63.28	18.50	22.2	38.57	19.09	22.3	49.41	44.16
22.9	28.92	14.76	23.0	43.17	32.68	23.2	62.88	18.38	23.2	37.22	19.06	23.3	49.18	44.33
23.9	28.98	14.49	24.0	43.16	32.40	24.2	62.46	18.26	24.2	35.76	19.03	24.3	48.93	44.51
24.9	29.04	14.21	24.9	43.15	32.10	25.2	62.01	18.13	25.2	34.20	18.98	25.3	48.67	44.70
25.9	29.12	13.91	25.9	43.16	31.78	26.2	61.54	17.95	26.2	32.56	18.92	26.3	48.37	44.88
26.9	29.23	13.60	26.9	43.18	31.45	27.2	61.08	17.75	27.2	30.86	18.82	27.3	48.06	45.05
27.9	29.37	13.30	27.9	43.20	31.10	28.2	60.63	17.52	28.2	29.19	18.70	28.3	47.71	45.19
28.9	29.51	13.01	28.9	43.25	30.76	29.1	60.23	17.27	29.2	27.59	18.54	29.3	47.36	45.30
29.9	29.67	12.74	29.9	43.32	30.43	30.1	59.86	17.02	30.2	26.10	18.37	30.3	47.01	45.38
30.9	29.84	12.50	30.9	43.39	30.13	31.1	59.53	16.77	31.2	24.72	18.20	31.3	46.67	45.45
31.9	30.00	12.27	31.9	43.46	29.86	32.1	59.25	16.52	32.2	23.44	18.03	32.3	46.37	45.51
	10.73	−10.69		8.54	−8.48		24.62	−24.60		75.27	−75.26		15.98	−15.95
	$12^h\ 45^m$	$43^s.33$		$14^h\ 12^m$	$50^s.81$		$18^h\ 3^m$	$48^s.95$		$19^h\ 21^m$	$19^s.15$		$22^h\ 15^m$	$19^s.18$
	−84° 39′	3″.86		−83° 16′	13″.94		−87° 39′	53″.07		−89° 13′	57″.47		−86° 24′	39″.46

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Nov.	12 45	−84 39	Nov.	14 12	−83 16	Nov.	18 3	−87 40	Nov.	19 21	−89 14	Nov.	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.9	30.15	12.07	1.9	43.53	29.60	1.1	59.25	16.52	1.2	83.44	18.03	1.3	46.37	45.51
2.9	30.29	11.87	2.9	43.58	29.35	2.1	58.96	16.30	2.2	82.23	17.88	2.3	46.07	45.57
3.9	30.41	11.66	3.9	43.63	29.10	3.1	58.68	16.10	3.2	81.05	17.74	3.3	45.80	45.63
4.9	30.53	11.44	4.9	43.67	28.84	4.1	58.39	15.90	4.2	79.84	17.62	4.3	45.53	45.72
5.9	30.65	11.21	5.9	43.71	28.57	5.1	58.07	15.71	5.2	78.58	17.51	5.3	45.25	45.82
6.9	30.78	10.97	6.9	43.75	28.28	6.1	57.73	15.52	6.2	77.25	17.40	6.3	44.97	45.92
7.9	30.91	10.72	7.9	43.80	27.98	7.1	57.36	15.32	7.2	75.83	17.28	7.3	44.67	46.03
8.9	31.07	10.45	8.9	43.85	27.68	8.1	56.98	15.10	8.2	74.37	17.14	8.3	44.35	46.13
9.9	31.23	10.19	9.9	43.93	27.35	9.1	56.61	14.85	9.2	72.87	16.99	9.3	44.02	46.23
10.9	31.41	9.93	10.9	44.01	27.03	10.1	56.25	14.58	10.2	71.36	16.81	10.3	43.65	46.32
11.9	31.61	9.69	11.9	44.10	26.72	11.1	55.92	14.29	11.2	69.87	16.61	11.3	43.28	46.39
12.9	31.82	9.46	12.9	44.21	26.42	12.1	55.60	14.00	12.2	68.43	16.39	12.3	42.90	46.42
13.9	32.03	9.27	13.9	44.33	26.13	13.1	55.31	13.69	13.2	67.08	16.14	13.3	42.53	46.44
14.9	32.24	9.09	14.9	44.44	25.86	14.1	55.07	13.37	14.2	65.84	15.90	14.3	42.17	46.44
15.9	32.45	8.91	15.9	44.56	25.62	15.1	54.87	13.06	15.2	64.72	15.65	15.3	41.83	46.42
16.9	32.64	8.78	16.9	44.67	25.39	16.1	54.70	12.77	16.2	63.71	15.42	16.3	41.51	46.39
17.9	32.82	8.64	17.9	44.78	25.18	17.1	54.54	12.49	17.2	62.77	15.20	17.3	41.21	46.36
18.9	33.00	8.49	18.9	44.87	24.98	18.1	54.38	12.24	18.1	61.86	14.99	18.3	40.93	46.35
19.9	33.17	8.34	19.9	44.96	24.76	19.1	54.21	12.00	19.1	60.91	14.79	19.3	40.64	46.35
20.9	33.33	8.18	20.9	45.05	24.52	20.1	54.01	11.77	20.1	59.92	14.62	20.3	40.36	46.36
21.9	33.51	7.99	21.9	45.14	24.28	21.1	53.78	11.53	21.1	58.83	14.43	21.3	40.06	46.38
22.9	33.71	7.79	22.9	45.24	24.01	22.1	53.54	11.27	22.1	57.65	14.23	22.3	39.73	46.40
23.9	33.92	7.60	23.9	45.37	23.72	23.1	53.29	10.97	23.1	56.42	13.99	23.3	39.39	46.41
24.9	34.16	7.41	24.9	45.50	23.44	24.1	53.07	10.65	24.1	55.20	13.73	24.3	39.00	46.39
25.9	34.41	7.26	25.9	45.66	23.18	25.1	52.87	10.30	25.1	54.04	13.44	25.2	38.62	46.35
26.8	34.67	7.13	26.9	45.83	22.95	26.1	52.72	9.93	26.1	53.00	13.13	26.2	38.24	46.27
27.8	34.92	7.04	27.9	46.00	22.73	27.1	52.62	9.57	27.1	52.09	12.81	27.2	37.87	46.16
28.8	35.17	6.95	28.9	46.16	22.54	28.1	52.56	9.23	28.1	51.30	12.49	28.2	37.54	46.04
29.8	35.40	6.88	29.9	46.31	22.37	29.1	52.52	8.91	29.1	50.62	12.20	29.2	37.22	45.93
30.8	35.62	6.81	30.9	46.45	22.20	30.1	52.50	8.61	30.1	50.00	11.92	30.2	36.92	45.82
31.8	35.82	6.75	31.9	46.59	22.03	31.1	52.45	8.31	31.1	49.38	11.65	31.2	36.65	45.72
	10.73	−10.68		8.54	−8.48		24.60	−24.58		75.16	−75.16		15.98	−15.95
	$12^h\ 45^m$	$43^s.33$		$14^h\ 12^m$	$50^s.81$		$18^h\ 3^m$	$48^s.95$		$19^h\ 21^m$	$19^s.15$		$22^h\ 15^m$	$19^s.18$
	−84° 39′	3″.86		−83° 16′	13″.94		−87° 39′	53″.07		−89° 13′	57″.47		−86° 24′	39″.46

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Dec.	12 45	−84 39	Dec.	14 12	−83 16	Dec.	18 3	−87 39	Dec.	19 21	−89 14	Dec.	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.8	35.82	6.75	1.9	46.59	22.03	1.1	52.45	68.31	1.1	49.38	11.65	1.2	36.65	45.72
2.8	36.02	6.66	2.9	46.72	21.86	2.1	52.39	68.04	2.1	48.72	11.39	2.2	36.37	45.64
3.8	36.23	6.56	3.9	46.85	21.67	3.1	52.31	67.76	3.1	47.99	11.14	3.2	36.09	45.57
4.8	36.44	6.45	4.9	46.99	21.48	4.1	52.22	67.48	4.1	47.23	10.90	4.2	35.80	45.50
5.8	36.67	6.34	5.9	47.13	21.26	5.0	52.12	67.19	5.1	46.42	10.64	5.2	35.49	45.44
6.8	36.90	6.23	6.9	47.27	21.03	6.0	52.01	66.89	6.1	45.56	10.37	6.2	35.16	45.36
7.8	37.14	6.12	7.9	47.44	20.82	7.0	51.91	66.56	7.1	44.70	10.07	7.2	34.82	45.27
8.8	37.40	6.03	8.9	47.61	20.61	8.0	51.82	66.21	8.1	43.85	9.76	8.2	34.47	45.17
9.8	37.68	5.94	9.9	47.80	20.41	9.0	51.77	65.85	9.1	43.06	9.42	9.2	34.11	45.04
10.8	37.96	5.88	10.9	47.99	20.21	10.0	51.76	65.48	10.1	42.36	9.08	10.2	33.76	44.90
11.8	38.24	5.85	11.9	48.20	20.05	11.0	51.78	65.11	11.1	41.78	8.73	11.2	33.41	44.72
12.8	38.51	5.85	12.9	48.40	19.92	12.0	51.84	64.73	12.1	41.34	8.36	12.2	33.09	44.53
13.8	38.77	5.86	13.9	48.60	19.81	13.0	51.94	64.38	13.1	41.00	8.00	13.2	32.79	44.33
14.8	39.01	5.88	14.9	48.78	19.72	14.0	52.07	64.05	14.1	40.75	7.68	14.2	32.52	44.13
15.8	39.25	5.90	15.9	48.96	19.64	15.0	52.20	63.74	15.1	40.57	7.37	15.2	32.27	43.93
16.8	39.47	5.92	16.9	49.12	19.55	16.0	52.30	63.46	16.1	40.38	7.06	16.2	32.03	43.76
17.8	39.68	5.92	17.9	49.28	19.45	17.0	52.39	63.18	17.1	40.15	6.78	17.2	31.81	43.60
18.8	39.91	5.90	18.8	49.44	19.34	18.0	52.46	62.90	18.1	39.85	6.50	18.2	31.56	43.44
19.8	40.15	5.88	19.8	49.61	19.20	19.0	52.51	62.61	19.1	39.47	6.22	19.2	31.30	43.30
20.8	40.41	5.86	20.8	49.80	19.06	20.0	52.54	62.29	20.1	39.04	5.91	20.2	31.01	43.14
21.8	40.68	5.84	21.8	49.99	18.92	21.0	52.59	61.94	21.1	38.57	5.57	21.2	30.70	42.97
22.8	40.97	5.84	22.8	50.21	18.78	22.0	52.67	61.58	22.1	38.16	5.20	22.2	30.37	42.76
23.8	41.26	5.87	23.8	50.44	18.66	22.9	52.79	61.21	23.1	37.85	4.81	23.2	30.04	42.53
24.8	41.56	5.94	24.8	50.67	18.58	23.9	52.96	60.81	24.0	37.67	4.42	24.2	29.74	42.28
25.8	41.85	6.03	25.8	50.89	18.53	24.9	53.17	60.44	25.0	37.64	4.03	25.2	29.46	42.00
26.8	42.12	6.13	26.8	51.10	18.49	25.9	53.41	60.10	26.0	37.73	3.64	26.2	29.20	41.72
27.8	42.37	6.23	27.8	51.31	18.47	26.9	53.69	59.77	27.0	37.91	3.29	27.2	28.98	41.45
28.8	42.60	6.33	28.8	51.52	18.46	27.9	53.94	59.46	28.0	38.12	2.95	28.2	28.78	41.19
29.8	42.83	6.42	29.8	51.70	18.43	28.9	54.18	59.18	29.0	38.31	2.63	29.2	28.59	40.95
30.8	43.06	6.51	30.8	51.87	18.40	29.9	54.40	58.90	30.0	38.46	2.32	30.2	28.39	40.71
31.8	43.29	6.58	31.8	52.06	18.36	30.9	54.61	58.63	31.0	38.54	2.02	31.2	28.17	40.49
32.8	43.54	6.64	32.8	52.26	18.29	31.9	54.81	58.34	32.0	38.58	1.71	32.1	27.96	40.28
10.73	−10.68		8.54	−8.48		24.57	−24.55		74.94	−74.93		15.98	−15.95	
12ʰ 45ᵐ	43ˢ.33		14ʰ 12ᵐ	50ˢ.81		18ʰ 3ᵐ	48ˢ.95		19ʰ 21ᵐ	19ˢ.15		22ʰ 15ᵐ	19ˢ.18	
−84° 39′	3″.86		−83° 16′	13″.94		−87° 39′	53″.07		−89° 13′	57″.47		−86° 24′	39″.46	

MEAN ERRORS OF NEWCOMB'S PLACES FOR 1920 OF STARS OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

Cat. No.	Name.	R. A. 1913.		Decl. 1913.	Mean Error 1920.	
					α	δ
		h	m	°	s	″
1	33 Piscium	0	1	− 6	.018	.25
3	α Androm.		4	+29	.010	.13
4	β Cassiop.		5	+59	.017	.17
5	ε Phœnicis		5	−46	.051	.41
6	22 Androm.		6	+46	.024	.28
10	γ Pegasi	0	9	+15	.011	.14
14	σ Androm.		14	+36	.029	.33
15	ι Ceti		15	− 9	.014	.20
16	ζ Tucanæ		16	−65	.047	.38
19	44 Piscium		21	+ 1	.018	.22
20	β Hydri	0	21	−78	....	...
21	α Phœnicis		22	−43	.047	.31
23	12 Ceti		26	− 4	.017	.21
30	13 Ceti		31	− 4	.023	.30
31	ζ Cassiop.		32	+53	.021	.20
32	π Androm.	0	32	+33	.021	.21
35	ε Androm.		34	+29	.016	.19
36	δ Androm.		35	+30	.018	.22
37	α Cassiop.		36	+56	.012	.14
38	μ Phœnicis		37	−47	....	.53
39	β Ceti	0	39	−18	.013	.17
42	ο Cassiop.		40	+48	.034	.26
41	21 Cassiop.		40	+75	.017	.24
45	ζ Androm.		43	+24	.019	.24
46	η Cassiop.		44	+57	.017	.24
49	δ Piscium	0	44	+ 7	.014	.20
52	λ Hydri		46	−75	....	.70
53	20 Ceti		49	− 2	.018	.26
54	γ Cassiop.		51	+60	.018	.22
55	μ Androm.		52	+38	.017	.21
58	α Sculptoris	0	54	−30	.025	.23
59	43 H. Cephei		57	+86	.010	.17
61	ε Piscium	0	58	+ 7	.012	.26
66	β Phœnicis	1	2	−47	.050	.47
65	μ Cassiop.		2	+54	.022	.27
69	η Ceti	1	4	−11	.025	.22
71	β Androm.		5	+35	.013	.17
74	τ Piscium		7	+30	.019	.33
76	ζ Piscium		9	+ 7	.019	.24
78	κ Tucanæ		13	−69	.....	...
79	*f* Piscium	1	13	+ 3	.022	.29
80	υ Piscium		15	+27	.022	.25
85	θ Ceti		20	− 9	.013	.19
86	δ Cassiop.		20	+60	.018	.19
91	γ Phœnicis		25	−44	.044	.35
90	38 Cassiop.	1	25	+70	.026	.28
94	η Piscium		27	+15	.020	.19
89	α Urs. Min.		28	+89	....	...
96	40 Cassiop.		32	+73	.028	.25
97	υ Androm.		32	+41	.024	.26
98	π Piscium	1	32	+12	.022	.25
99	υ Persei		33	+48	.018	.19
101	α Eridani		34	−58	....	...
103	ω Cassiop.		36	+68	.025	.25
104	ν Piscium		37	+ 5	.014	.20
105	φ Persei	1	38	+50	.022	.20
107	τ Ceti		40	−16	.020	.25
108	ο Piscium		41	+ 9	013	.19
109	ε Sculpt.	1	42	−25	.037	.46
112	4 Octantis(G.)	1	42	−85	.039	.40
116	ζ Ceti		47	−11	.020	.24
118	α Trianguli		48	+29	.022	.22
117	ε Cassiop.		48	+63	.017	.17
120	ξ Piscium		49	+ 3	.018	.23
121	β Arietis	1	50	+20	.013	.20
122	ψ Phœnicis		50	−47	.080	.81
127	υ Ceti		56	−22	.025	.32
126	50 Cassiop.		56	+72	.016	.17
129	α Hydri		56	−62	.049	.34
131	γ Andr. *pr.*	1	59	+42	.016	.16
133	α Arietis	2	2	+23	.010	.14
134	β Trianguli		4	+35	.018	.21
136	55 Cassiop.		8	+66	.025	.24
137	6 Persei		8	+51	.025	.27
138	ξ^1 Ceti	2	8	+ 8	.018	.23
139	μ Fornacis		9	−31	.076	.83
141	γ Trianguli		12	+33	.024	.31
142	67 Ceti		13	− 7	.021	.25
144	φ Eridani		13	−52	.049	.42
145	ο Ceti	2	15	− 3	.018	.23
146	κ Fornacis		19	−24	.049	.47
148	δ Hydri		20	−69	....	...
149	ι Cassiop.		22	+67	.025	.25
153	ξ^2 Ceti		24	+ 8	.014	.19
156	σ Ceti	2	28	−16	.028	.37
157	36 H. Cassiop.		30	+72	.021	.22
160	ν Ceti		31	+ 5	.020	.26
163	μ Hydri		33	−79	.056	.70
161	ν Arietis		34	+22	.020	.26
165	δ Ceti	2	35	− 0	.014	.20
172	ε Hydri		38	−69	....	...
170	θ Persei		38	+49	.021	.19
173	γ Ceti *seq.*		39	+ 3	.016	.20
174	π Ceti		40	−14	.025	.25
175	μ Ceti	2	40	+10	.020	.21
177	η Persei		44	+56	.010	.25
178	41 Arietis		45	+27	.020	.22
179	β Fornacis		45	−33	.050	.47
180	σ Arietis		47	+15	.018	.24
181	τ^2 Eridani	2	47	−21	.022	.32
182	τ Persei		48	+52	.020	.19
183	η Eridani		52	− 9	.016	.21
185	ε Arietis		54	+21	.016	.23
184	47 H. Cephei		54	+79	.035	.32
187	θ Eridani	2	55	−41	.056	.42
189	α Ceti		58	+ 4	.010	.13
190	γ Persei		58	+53	.029	.20
191	τ^3 Eridani	2	59	−24	.029	.32
192	ρ Persei	3	0	+38	.019	.24
194	μ Horologii	3	2	−60	.060	.49
197	θ Hydri		2	−72	.046	.47
195	β Persei		2	+41	.016	.20
199	δ Arietis		7	+19	.014	.17
202	12 Eridani		8	−29	.022	.30
200	48 H. Cephei	3	9	+77	.032	.32
203	ζ Arietis		10	+21	.018	.29
204	38 Horologii(G.)		10	−58	....	...
206	ζ Eridani	3	12	− 9	.022	.31

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Cat. No.	Name.	R. A. 1913.		Decl. 1913.	Mean Error 1920.		Cat. No.	Name.	R. A. 1913.		Decl. 1913.	Mean Error 1920.	
					α	δ						α	δ
		h	m	°	s	″			h	m	°	s	″
209	τ Arietis	3	16	+21	.027	.32	319	η Aurigæ	5	0	+41	.021	.21
210	e Eridani		16	−43	.056	.49	320	ε Leporis		2	−22	.021	.25
212	ι Hydri		18	−78	....	...	322	β Eridani		4	− 5	.016	.21
211	α Persei		18	+50	.013	.14	327	μ Aurigæ		7	+38	.028	.29
213	o Tauri		20	+ 9	.014	.21	326	19 H. Camelop.		8	+79	.025	.33
214	2 H. Camel.	3	22	+60	.028	.37	328	μ Leporis	5	9	−16	.032	.31
215	ξ Tauri		22	+ 9	.023	.22	329	α Aurigæ		10	+46	.012	.14
219	f Tauri		26	+13	.016	.22	330	β Orionis		10	− 8	.009	.15
221	ε Eridani		29	−10	.014	.17	332	λ Aurigæ		13	+40	.027	.27
222	τ^{5} Eridani		30	−22	.031	.40	333	τ Orionis		13	− 7	.014	.24
230	δ Persei	3	37	+48	.016	.16	335	o Columbæ	5	14	−35	.068	.60
235	δ Eridani		39	−10	.020	.24	342	γ Orionis		20	+ 6	.017	.21
234	ν Persei		39	+42	.024	.25	343	β Tauri		21	+29	.010	.14
237	5 H. Camel.		41	+71	.025	.29	344	17 Camelop.		22	+63	.029	.22
238	η Tauri		42	+24	.014	.17	347	β Leporis		25	−21	.025	.33
239	τ^{6} Eridani	3	43	−24	.023	.30	348	χ Aurigæ	5	27	+32	.022	.30
243	g Eridani		46	−36	.073	.63	350	δ Orionis		28	− 0	.012	.16
246	γ Hydri		49	−75	.031	.29	349	Gr. 966		28	+75	.022	.22
244	ζ Persei		49	+32	.019	.22	354	α Leporis		29	−18	.018	.22
245	9 H. Camel.		50	+61	.031	.33	355	ϕ^{1} Orionis		30	+ 9	.021	.31
248	ε Persei	3	52	+40	.019	.22	359	ι Orionis	5	31	− 6	.022	.25
250	ξ Persei		53	+36	.019	.22	361	θ Orionis		32	− 1	.013	.17
251	γ Eridani		54	−14	.017	.19	362	ζ Tauri		32	+21	.019	.23
252	λ Tauri		56	+12	.018	.22	356	Gr. 944		34	+85	.030	35
254	δ Reticuli		57	−62	.044	.36	366	ζ Orionis		36	− 2	.016	.22
255	ν Tauri	3	59	+ 6	.018	.22	368	α Columbæ	5	36	−34	.024	.28
256	A Tauri	4	0	+22	.020	.23	369	o Aurigæ		39	+50	.028	.39
260	c Persei		2	+47	.020	.22	372	ζ Leporis		43	−15	.023	.30
263	p Tauri		6	+26	.030	.37	373	κ Orionis		44	−10	.013	.19
265	o^{1} Eridani		8	− 7	.016	.23	375	δ Doradus		45	−66	....	...
264	Gr. 750	4	9	+85	.017	.24	374	ν Aurigæ	5	45	+39	.021	.26
268	μ Tauri		11	+ 9	.027	.47	381	31 Mensæ (G.)		47	−85	.042	.56
270	α Horologii		11	−43	.073	.69	378	δ Leporis		48	−21	.036	.37
271	α Reticuli		13	−63	.061	.54	382	α Orionis		50	+ 7	.008	.14
274	γ Tauri		15	+15	.013	.21	383	δ Aurigæ		52	+54	.026	.25
277	δ Tauri	4	18	+17	.017	.23	385	η Leporis	5	52	−14	.022	.22
279	υ^{5} Eridani		21	−34	.046	.42	387	β Aurigæ		53	+45	.016	.16
281	ε Tauri		24	+19	.013	.20	388	θ Aurigæ		54	+37	.020	.20
284	δ Mensæ		24	−80	.058	.52	393	1 Gemin.	5	59	+23	.021	.30
285	m Persei		27	+43	.031	.34	395	1 Puppis (G.)	6	2	−45	.057	.55
288	α Tauri	4	31	+16	.009	.13	396	ν Orionis	6	3	+15	.016	.19
289	ν Eridani		32	− 4	.018	.24	402	22 H. Camelop.		9	+69	.022	.26
291	α Doradus		32	−55	.054	.40	405	η Gemin.		10	+23	.014	.20
292	53 Eridani		34	−14	.023	.28	406	2 Lyncis		12	+59	.023	.22
296	τ Tauri		37	+23	.014	.23	411	ζ Can. Maj.		17	−30	.055	.44
294	Gr. 848	4	37	+76	.024	.30	412	μ Gemin.	6	18	+23	.013	.17
297	α Cœli		38	−42	.050	.46	413	ψ^{1} Aurigæ		18	+49	.025	.23
298	4 Camelop.		41	+57	.027	.25	414	β Can. Maj.		19	−18	.019	.22
299	μ Eridani		41	− 3	.016	.21	415	8 Monoc.		19	+ 5	.022	.24
303	π^{3} Orionis		45	+ 7	.021	.22	416	α Argûs		22	−53	....	...
302	9 Camelop.	4	45	+66	.021	.19	418	10 Monoc.	6	24	− 5	.017	.37
304	i Tauri		46	+19	.023	.31	419	ν Gemin.		24	+20	.027	.21
307	π^{5} Orionis		50	+ 2	.016	.22	423	8 Lyncis		30	+62	.022	.23
309	ι Aurigæ		51	+33	.014	.17	424	23 H. Camelop.		31	+80	.024	.29
312	β Camelop.		56	+60	.023	.19	425	ξ^{2} Can. Maj.		31	−23	.034	.35
313	ε Aurigæ	4	56	+44	.021	.19	426	51 Aurigæ	6	33	+39	.025	.31
314	ζ Aurigæ		56	+41	.017	.22	427	γ Gemin.		33	+16	.013	.17
316	ι Tauri	4	58	+21	.019	.26	429	ν Argûs		35	−43	.058	.48
318	11 Orionis	5	0	+15	.020	.35	430	S Monoc.	6	36	+10	.016	.22

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Cat. No.	Name.	R. A. 1913.		Decl. 1913.	Mean Error 1920.		Cat. No.	Name.	R. A 1913.		Decl. 1913.	Mean Error 1920.	
					α	δ						α	δ
		h	m	°	s	″			h	m	°	s	″
431	ε Gemin.	6	39	+25	.014	.19	536	30 Monoc.	8	21	− 4	.017	.23
433	ξ Gemin.		40	+13	.013	.21	537	ο Urs. Maj.		23	+61	.014	.15
432	ψ^5 Aurigæ		40	+44	.029	.24	539	θ Chamæl.		23	−77	.050	.40
434	α Can. Maj.		41	−17	....	.16	543	Gr. 1450		27	+38	.047	.43
435	18 Monoc.		43	+ 3	.020	.25	544	η Cancri		28	+21	.019	.20
436	43 Camelop.	6	44	+69	.027	.24	545	Gr. 1446	8	30	+74	.032	.38
440	θ Gemin.		47	+34	.020	.22	547	δ Hydræ		33	+ 6	.019	.26
441	α Pictoris		47	−62	.061	.63	548	σ Hydræ		34	+ 4	.023	.27
443	ζ Mensæ		47	−81	.048	.47	554	γ Cancri		38	+22	.016	.21
442	τ Argûs		48	−51	.069	.64	556	δ Cancri		40	+18	.017	.21
444	15 Lyncis	6	50	+59	.023	.21	557	α Pyxidis	8	40	−33	.053	.42
446	θ Can. Maj.		50	−12	.021	.31	558	ι Cancri		41	+29	.025	.26
451	ε Can. Maj.		55	−29	.017	.23	559	ε Hydræ		42	+ 7	.014	.19
454	ζ Gemin.		59	+21	.016	.19	560	δ Argûs		42	−54	.053	.41
455	o^2 Can. Maj.	6	59	−24	.025	.29	566	σ^2 Cancri		49	+31	.022	.31
456	γ Can. Maj.	7	0	−16	.021	.28	567	ζ Hydræ	8	51	+ 6	.018	.24
449	51 H. Cephei		0	+87	....	...	569	ι Urs. Maj.		53	+48	.016	.17
460	δ Can. Maj.		5	−26	.020	.24	571	α Cancri		54	+12	.015	.20
461	63 Aurigæ		6	+39	.021	.26	574	b^1 Carinæ		55	−59	.044	.43
464	51 Gemin.		8	+16	.023	.37	576	κ Urs. Maj.	8	58	+48	.018	.19
465	γ^2 Volantis	7	9	−70	.071	.64	582	σ^2 Urs. Maj.	9	3	+67	.020	.28
467	25 H. Camel.		13	+83	.025	.24	583	κ Cancri		3	+11	.016	.22
469	λ Gemin.		13	+17	.013	.22	585	λ Argûs		5	−43	.039	.32
470	π Argûs		14	−37	.046	.34	590	ζ Octantis		10	−85	.041	.38
471	δ Gemin.		15	+22	.014	.17	589	θ Hydræ		10	+ 3	.014	.19
474	δ Volantis	7	17	−68	.061	.64	591	β Argûs	9	12	−69	.035	.28
480	7 Octant.(G.)		18	−87	.053	.46	593	83 Cancri		14	+18	.018	.24
476	ι Gemin.		20	+28	.014	.22	594	ι Argûs		15	−59	....	...
477	η Can. Maj.		21	−29	.021	.25	595	40 Lyncis		16	+35	.018	.21
478	Gr. 1308		22	+69	.028	.26	596	θ Pyxidis		18	−26	.046	.61
479	β Can. Min.	7	22	+ 8	.014	.19	599	α Hydræ	9	23	− 8	.010	.15
481	ρ Gemin.		24	+32	.021	.27	601	h Urs. Maj.		25	+63	.019	.19
483	σ Argûs		26	−43	.060	.46	600	1 H. Draco.		25	+82	.016	.20
484	α^2 Gemin.		29	+32	.019	.14	603	d Urs. Maj.		27	+70	.025	.24
488	25 Monoc.		33	− 4	.040	.42	604	θ Urs. Maj.		27	+52	.017	.17
492	α Can. Min.	7	35	+ 5	....	.15	605	ξ Leonis	9	27	+12	.024	.30
493	24 Lyncis		36	+59	.033	.29	606	ψ Argûs		27	−40	.056	.51
495	κ Gemin.		39	+25	.018	.22	607	10 Leo. Min.		29	+37	.020	.27
496	β Gemin.		40	+28	.010	.12	620	ζ Chamæl.		36	−81	.047	.48
499	4 Puppis		42	−14	.028	.36	619	ο Leonis		37	+10	.014	.16
502	ξ Argûs	7	46	−25	.021	.27	622	θ Antliæ	9	40	−27	.057	.49
505	φ Gemin.		48	+27	.018	.28	623	ε Leonis		41	+24	.014	.17
506	26 Lyncis		48	+48	.022	.30	626	υ Urs. Maj.		45	+59	.013	.17
507	Gr. 1374		50	+74	.029	.32	627	υ Argûs		45	−65	.049	.38
514	χ Argûs		55	−53	.052	.40	629	6 Sextantis		47	− 4	.030	.35
515	ω Cancri	7	56	+26	.022	.30	630	μ Leonis	9	48	+26	.014	.19
517	χ Gemin.	7	58	+28	.018	.24	632	Gr. 1586		51	+73	.026	.32
520	27 Lyncis	8	2	+52	.022	.23	634	19 Leo. Min.		52	+41	.022	.24
523	ρ Argûs		4	−24	.018	.24	636	φ Argûs		54	−54	.045	.37
522	3 H. Ur. Maj.		4	+69	.025	.29	638	π Leonis	9	56	+ 8	.012	.20
525	γ Argûs	8	7	−47	.051	.44	641	η Leonis	10	3	+17	.022	.22
526	ζ Cancri		7	+18	.022	.25	642	α Leonis		4	+12	.015	.13
527	Br. 1147		9	+76	.026	.31	644	λ Hydræ		6	−12	.019	.24
528	20 Puppis		9	−16	.023	.32	645	q Velorum		11	−42	.088	.76
518	Gr. 1119		12	+89	.025	...	646	32 Urs. Maj.		12	+66	.024	.25
529	β Cancri	8	12	+ 9	.013	.24	648	ζ Leonis	10	12	+24	.018	.22
533	31 Lyncis		17	+43	.027	.22	647	λ Urs. Maj.		12	+43	.017	.16
534	d^1 Cancri		18	+19	.022	.29	653	γ Leonis *pr.*		15	+20	.019	.15
535	ε Argûs	8	21	−59	.038	.33	657	μ Urs. Maj.	10	17	+42	.016	.19

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Cat. No.	Name.	R. A. 1913.	Decl. 1913.	Mean Error 1920.		Cat. No.	Name.	R. A. 1913.	Decl. 1913.	Mean Error 1920.	
				α	δ					α	δ
		h m	°	s	″			h m	°	s	″
658	30 H. Ur. Maj.	10 18	+66	.031	.27	770	β Chamæl.	12 13	−79	.037	.32
659	30 H. Camel.	21	+83	.026	.30	772	Br. 1672	14	+88	.016	.22
661	μ Hydræ	22	−16	.018	.22	773	η Virginis	15	− 0	.013	.17
662	31 Leo. Min.	23	+37	.019	.24	780	α¹ Crucis	22	−63	....	...
664	α Antliæ	23	−31	.044	.35	787	20 Comæ	25	+21	.034	.38
666	36 Urs. Maj.	10 25	+56	.022	.25	786	δ Corvi	12 25	−16	.018	.22
668	9 H. Draco.	28	+76	.019	.21	789	γ Crucis	26	−57	.084	.37
669	ρ Leonis	28	+10	.016	.21	791	8 Can. Ven.	30	+42	.022	.23
679	33 Sextantis	37	− 1	.024	.31	793	κ Draconis	30	+70	.018	.14
683	41 Leo. Min.	39	+24	.022	.26	792	β Corvi	30	−23	.019	.21
684	θ Argûs	10 40	−64	.052	.41	795	24 Comæ *seq.*	12 31	+19	.025	.30
685	42 Leo. Min.	41	+31	.019	.28	796	α Muscæ	32	−69	.063	.51
687	η Argûs	42	−59	....	...	799	χ Virginis	35	− 8	.024	.31
688	μ Argûs	43	−49	.049	.37	800	γ Centauri	37	−48	.041	.33
689	*l* Leonis	45	+11	.015	.20	801	γ Virginis	37	− 1	.018	.24
691	δ² Chamæl.	10 45	−80	.047	.39	802	ρ Virginis	12 37	+11	.023	.29
690	ν Hydræ	45	−16	.022	.24	803	76 Urs. Maj.	38	+63	.034	.26
692	46 Leo. Min.	48	+35	.019	.21	808	β Crucis	43	−59	.034	.29
694	54 Leonis	51	+25	.027	.35	810	ι Octantis	46	−85	.046	.37
696	ι Antliæ	53	−37	.072	.95	812	31 Comæ	47	+28	.024	.27
695	Gr. 1706	10 53	+78	.034	.40	814	32 H. Camel.	12 48	+84	.021	.23
698	α Crateris	56	−18	.020	.25	813	*n* Centauri	49	−40	.068	.62
699	*d* Leonis	56	+ 4	.018	.24	816	ε Urs. Maj.	50	+56	.017	.19
701	β Urs. Maj.	57	+57	.017	.16	817	δ Virginis	51	+ 4	.013	.17
702	α Urs. Maj.	10 58	+62	.016	.15	818	α Can. Ven.	52	+39	.014	.17
704	η Octantis	11 0	−84	.044	.42	820	δ Muscæ	12 56	−71	.017	.33
703	χ Leonis	1	+ 8	.013	.19	821	ε Virginis	12 58	+11	.013	.17
706	*p*⁴ Leonis	2	+ 2	.022	.25	827	θ Virginis	13 5	− 5	.014	.17
708	ψ Urs. Maj.	5	+45	.016	.17	830	43 Comæ	8	+28	.019	.25
710	β Crateris	7	−22	.021	.33	836	20 Can. Ven.	14	+41	.024	.24
712	δ Leonis	11 9	+21	.014	.16	838	γ Hydræ	13 14	−23	.022	.35
713	θ Leonis	10	+16	.019	.21	839	ι Centauri	16	−36	.056	.43
718	ν Urs. Maj.	14	+34	.021	.21	842	ζ¹ Urs. Maj.	20	+55	.020	.19
719	δ Crateris	15	−14	.017	.19	843	α Virginis	21	−11	.008	.14
720	σ Leonis	17	+ 7	.014	.19	846	Gr. 2001	24	+73	.026	.31
721	π Centauri	11 17	−54	....	...	845	70 Virginis	13 24	+14	.025	.31
723	ι Leonis	19	+11	.018	.21	847	κ Octantis	27	−85	.039	.35
727	τ Leonis	23	+ 3	.016	.21	852	ζ Virginis	30	− 0	.010	.17
730	λ Draconis	26	+70	.016	.16	854	17 H. Can. V.	31	+38	.041	.42
731	ξ Hydræ	29	−31	.050	.39	857	ε Centauri	34	−53	.039	.34
733	λ Centauri	11 32	−63	.053	.48	859	*m* Virginis	13 37	− 8	.015	.22
734	υ Leonis	32	− 0	.016	.18	863	τ Boötis	43	+18	.018	.19
735	π Chamæl.	34	−75	.079	.80	866	η Urs. Maj.	44	+50	.012	.14
737	3 Draconis	38	+67	.025	.25	867	89 Virginis	45	−18	.027	.35
738	ζ Crateris	40	−18	.019	.29	871	ζ Centauri	50	−47	.042	.33
740	χ Urs. Maj.	11 41	+48	016	.17	872	η Boötis	13 51	+19	.012	.17
744	β Leonis	45	+15	.010	.14	878	θ Apodis	57	−76	....	...
745	β Virginis	46	+ 2	.012	.14	879	τ Virginis	57	+ 2	.013	.18
747	Gr. 1830	48	+38	.037	.32	880	11 Boötis	57	+28	.023	.26
748	γ Urs. Maj.	49	+54	.012	.14	881	β Centauri	13 58	−60	....	...
753	π Virginis	11 56	+ 7	.016	.21	882	π Hydræ	14 1	−26	.021	.26
758	ο Virginis	12 1	+ 9	.016	.15	883	θ Centauri	2	−36	.044	.33
760	δ Centauri	4	−50	.067	.46	885	α Draconis	2	+65	.016	.17
762	ε Corvi	6	−22	.020	.23	888	*d* Boötis	6	+26	.023	.38
763	4 H. Draco.	8	+78	.017	.19	889	κ Virginis	8	−10	.013	.21
765	δ Crucis	12 11	−58	.058	.45	890	4 Urs. Min.	14 9	+78	.018	.24
766	δ Urs. Maj.	11	+58	.020	.17	891	ι Virginis	11	− 6	.017	.21
767	γ Corvi	11	−17	.019	.20	893	α Boötis	12	+20	.008	.13
768	2 Can. Ven.	12 12	+41	.032	.32	892	δ Octantis	14 13	−83	.035	.30

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Cat. No.	Name.	R. A. 1913.	Decl. 1913.	Mean Error 1920.	
				α	δ
		h m	°	s	″
894	λ Boötis	14 13	+46	.019	.21
898	λ Virginis	14	−13	.017	.24
901	2 Libræ	19	−11	.025	.33
904	θ Boötis	22	+52	.018	.17
905	*f* Boötis	22	+20	.021	.26
907	φ Virginis	14 24	− 2	.018	.25
911	5 Urs. Min.	28	+76	.019	.21
910	ρ Boötis	28	+31	.016	.19
912	γ Boötis	29	+39	.017	.21
914	η Centauri	30	−42	.045	.37
915	σ Boötis	14 31	+30	.025	.32
917	α^2 Centauri	34	−60	....	...
919	33 Boötis	36	+45	.034	.33
921	α Apodis	37	−79	.044	.47
926	μ Virginis	38	− 5	.014	.21
930	ε Boötis	14 41	+27	.016	.16
932	109 Virginis	42	+ 2	.018	.22
934	8 Libræ	46	−16	.018	.20
936	α Libræ	46	−16	.010	.14
941	Gr. 2164	49	+60	.033	.35
944	β Urs. Min.	14 51	+75	.016	.16
945	ξ^2 Libræ	52	−11	.018	.23
946	Piazzi 221	52	+15	.025	.29
948	β Lupi	53	−43	.054	.45
950	δ Libræ	56	− 8	.026	.25
952	β Boötis	14 59	+41	.020	.22
953	γ Scorpii	14 59	−25	.024	.29
955	ψ Boötis	15 1	+27	.018	.22
957	*c* Boötis	3	+25	.030	.33
962	Gr. 2283	5	+88	.023	.29
959	ζ Lupi	15 6	−52	.059	.51
960	ι Libræ	7	−19	.021	.24
963	γ Tri. Aust.	11	−68	.044	.36
965	3 Serpentis	11	+ 5	.029	.31
966	δ Boötis	12	+34	.018	.23
967	β Libræ	15 12	− 9	.013	.17
976	γ Urs. Min.	21	+72	.018	.16
975	μ Boötis *pr.*	21	+38	.019	.22
977	τ^1 Serpentis	22	+16	.026	.36
979	ι Draconis	23	+59	.025	.21
973	ρ Octantis	15 23	−84	.037	.38
978	32 Libræ	23	−16	.018	.28
980	β Cor. Bor.	24	+29	.025	.22
981	ν^1 Boötis	28	+41	.023	.31
984	γ Lupi(*mean*)	29	−41	.043	.35
986	γ Libræ	15 31	−14	.021	.24
987	α Cor. Bor.	31	+27	.010	.13
993	ζ Cor.Bor.*seq.*	36	+37	.027	.36
997	α Serpentis	40	+ 7	.010	.13
998	β Serpentis	42	+16	.018	.21
999	κ Serpentis	15 45	+18	.024	.25
1000	μ Serpentis	45	− 3	.019	.35
1002	12 H. Draco.	45	+63	.028	.32
1003	ε Serpentis	46	+ 5	.014	.19
1006	ζ Urs. Min.	47	+78	.016	.15
1004	β Tri. Aust.	15 47	−63	.059	.45
1005	λ Libræ	48	−20	.026	.36
1009	γ Serpentis	52	+16	.016	.23
1010	π Scorpii	15 54	−26	.023	.29
1011	ε Cor. Bor.	15 54	+27	.023	.24
1012	δ Scorpii	15 55	−22	.020	.26
1019	θ Draconis	16 0	+59	.018	.17
1017	β Scorpii	0	−20	.014	.17
1021	κ Herculis	4	+17	.028	.33
1026	φ Herculis	16 6	+45	.025	.22
1027	Gr. 2320	6	+68	.032	.35
1023	δ^1 Apodis	7	−78	.053	.49
1030	δ Ophiuchi	10	− 3	.012	.17
1031	σ Cor.Bor. *seq.*	11	+34	.037	.42
1034	19 Urs. Min.	16 13	+76	.029	.23
1032	γ^2 Normæ	13	−50	.049	.38
1033	ε Ophiuchi	14	− 4	.014	.22
1035	σ Scorpii	16	−25	.019	.28
1036	τ Herculis	17	+47	.022	.20
1039	γ Herculis	16 18	+19	.016	.21
1045	η Urs. Min.	20	+76	.022	.22
1041	γ Apodis	20	−79	.033	.38
1046	ω Herculis	21	+14	.030	.37
1050	η Draconis	23	+62	.018	.17
1051	α Scorpii	16 24	−26	.013	.21
1056	β Herculis	26	+22	.018	.21
1055	λ Ophiuchi	27	+ 2	.017	.22
1059	A Draconis	28	+69	.022	.19
1061	τ Scorpii	30	−28	.021	.25
1062	σ Herculis	16 31	+43	.017	.18
1063	ζ Ophiuchi	32	−10	.014	.20
1065	24 Scorpii	37	−18	.022	.30
1067	ζ Herculis	38	+32	.016	.17
1068	α Tri. Aust.	39	−69	.036	.29
1069	η Herculis	16 40	+39	.015	.17
1071	Gr. 2377	44	+57	.038	.45
1073	ε Scorpii	45	−34	.040	.33
1078	49 Herculis	48	+15	.024	.29
1083	ε^1 Aræ	53	−53	.056	.50
1084	κ Ophiuchi	16 54	+10	.014	.17
1087	ε Urs. Min.	55	+82	.018	.16
1086	30 Ophiuchi	56	− 4	.035	.39
1088	ε Herculis	57	+31	.016	.21
1089	*d* Herculis	16 58	+34	.026	.30
1092	η Ophiuchi	17 5	−16	.016	.17
1093	η Scorpii	6	−43	.044	.34
1094	ζ Draconis	9	+66	.020	.19
1096	α Herculis	11	+14	.010	.14
1098	δ Herculis	11	+25	.020	.24
1100	π Herculis	17 12	+37	.018	.22
1101	59 Apodis (G.)	15	−81	.073	.74
1105	θ Ophiuchi	17	−25	.019	.21
1106	*w* Herculis	17	+33	.027	.30
1107	β Aræ	18	−55	.069	.49
1109	*b* Ophiuchi	17 21	−24	.018	.29
1111	σ Ophiuchi	22	+ 4	.017	.22
1112	δ Aræ	23	−61	....	...
1115	α Aræ	25	−50	.056	.46
1117	λ Herculis	27	+26	.031	.37
1118	λ Scorpii	17 28	−37	.058	.47
1119	β Draconis	28	+52	.014	.15
1123	α Ophiuchi	31	+13	.010	.14
1125	ξ Serpentis	17 33	−15	.024	.24

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Cat. No.	Name.	R. A. 1913.	Decl. 1913.	Mean Error 1920.		Cat. No.	Name.	R. A. 1913.	Decl. 1913.	Mean Error 1920.	
				α	δ					α	δ
		h m	°	s	″			h m	°	s	″
1131	ι Herculis	17 37	+46	.018	.17	1240	δ Draconis	19 13	+68	.016	.16
1129	η Pavonis	37	−65	.067	.58	1239	d Sagittarii	13	−19	.014	.29
1132	ω Draconis	37	+69	.021	.21	1241	θ Lyræ	13	+38	.025	.34
1134	β Ophiuchi	39	+ 5	.013	.17	1242	ω Aquilæ	14	+11	.019	.21
1135	ι¹ Scorpii	41	−40	.066	.54	1243	κ Cygni	15	+53	.019	.19
1137	μ Herculis	17 43	+28	.014	.19	1248	τ Draconis	19 17	+73	.019	.20
1140	ψ Draconis	43	+72	.021	.20	1251	δ Aquilæ	21	+ 3	.012	.17
1138	γ Ophiuchi	44	+ 3	.017	.21	1224	σ Octantis	21	−89	.025	.22
1145	89 Herculis	52	+26	.025	.33	1259	β Cygni	27	+28	.014	.22
1146	ξ Draconis	52	+57	.021	.21	1260	ι Cygni	28	+52	.020	.19
1147	θ Herculis	17 53	+37	.017	.21	1264	μ Aquilæ	19 30	+ 7	.024	.28
1150	35 Draconis	53	+77	.022	.23	1265	h Sagittarii	31	−25	.019	.26
1148	ν Ophiuchi	54	−10	.016	.22	1266	κ Aquilæ	32	− 7	.018	.28
1149	ξ Herculis	54	+29	.034	.30	1269	θ Cygni	34	+50	.019	.21
1151	γ Draconis	55	+51	.013	.16	1271	54 Sagittarii	36	−16	.022	.30
1152	67 Ophiuchi	17 56	+ 3	.031	.26	1273	β Sagittæ	19 37	+17	.016	.26
1156	θ Aræ	18 0	−50	.056	.50	1281	15 Cygni	41	+37	.029	.29
1158	γ Sagittarii	0	−30	.021	.39	1280	f Sagittarii	41	−20	.020	.30
1164	δ Urs. Min.	0	+87	....	...	1282	γ Aquilæ	42	+10	.009	.15
1159	70 Ophiuchi	1	+ 3	.022	.26	1283	δ Cygni	42	+45	.021	.18
1160	72 Ophiuchi	18 3	+10	.016	.19	1284	δ Sagittæ	19 44	+18	.017	.23
1153	χ Octantis	4	−88	.034	.30	1286	α Aquilæ	47	+ 9	.010	.14
1161	ο Herculis	4	+29	.019	.22	1288	η Aquilæ	48	+ 1	.022	.26
1166	μ Sagittarii	9	−21	.016	.19	1290	ε Draconis	48	+70	.024	.19
1169	η Sagittarii	12	−37	.057	.50	1289	ι Sagittarii	49	−42	.073	.62
1170	Gr. 2533	18 13	+42	.035	.40	1291	ε Pavonis	19 51	−73	....	...
1171	36 Draconis	13	+64	.020	.21	1292	β Aquilæ	51	+ 6	.008	.14
1173	δ Sagittarii	15	−30	.020	.25	1297	γ Sagittæ	55	+19	.017	.22
1174	η Serpentis	17	− 3	.016	.17	1299	c Sagittarii	19 57	−28	.017	.24
1175	ε Sagittarii	18	−34	.055	.46	1304	τ Aquilæ	20 0	+ 7	.022	.33
1178	109 Herculis	18 20	+22	.018	.21	1308	θ Aquilæ	20 7	− 1	.013	.18
1179	α Telescopii	21	−46	.049	.41	1314	ο Cygni *seq.*	11	+46	.019	.21
1182	λ Sagittarii	23	−25	.017	.22	1318	κ Cephei	12	+77	.018	.19
1185	χ Draconis	23	+73	.020	.20	1319	24 Vulpeculæ	13	+24	.025	.30
1187	c Serpentis	25	− 2	.027	.38	1320	α^2 Capricorni	13	−13	.012	.17
1189	1 Aquilæ	18 30	− 8	.013	.25	1321	β Capricorni	20 16	−15	.022	.21
1190	ζ Pavonis	33	−72	.016	.40	1324	α Pavonis	19	−57	....	...
1193	α Lyræ	34	+39	.009	.15	1325	γ Cygni	19	+40	.013	.17
1196	2 Aquilæ	38	− 9	.029	.30	1328	π Capricorni	22	−18	.019	.27
1199	φ Sagittarii	40	−27	.022	.26	1329	ρ Capricorni	24	−18	.018	.21
1202	110 Herculis	18 42	+20	.020	.22	1332	41 Cygni	20 26	+30	.029	.35
1204	6 Aquilæ	43	− 5	.020	.32	1336	θ Cephei	28	+63	.018	.17
1206	λ Pavonis	44	−62	.059	.52	1337	ε Delphini	29	+11	.013	.19
1209	β Lyræ	47	+33	.013	.16	1340	Gr. 3241	30	+72	.034	.40
1212	50 Draconis	49	+75	.031	.25	1341	α Indi	31	−48	.046	.37
1211	σ Sagittarii	18 50	−26	.018	.27	1344	β Delphini	20 33	+14	.016	.22
1213	ο Draconis	50	+59	.028	.21	1348	υ Capricorni	35	−18	.023	.33
1215	θ Serp. *pr.*	52	+ 4	.017	.25	1349	α Delphini	36	+16	.014	.22
1218	R Lyræ	53	+44	.025	.31	1350	β Pavonis	37	−67	....	...
1219	ε Aquilæ	56	+15	.017	.19	1352	α Cygni	38	+45	.010	.12
1220	γ Lyræ	18 56	+33	.018	.22	1353	δ Delphini	20 39	+15	.019	.24
1222	ζ Sagittarii	18 57	−30	.042	.37	1354	ψ Capricorni	41	−26	.028	.32
1226	ζ Aquilæ	19 1	+14	.014	.15	1356	γ Delph. *seq.*	43	+16	.024	.30
1227	λ Aquilæ	2	− 5	.014	.23	1357	ε Cygni	43	+34	.014	.21
1228	α Cor. Aust.	4	−38	.050	.42	1358	ε Aquarii	43	−10	.014	.19
1230	ι Lyræ	19 4	+36	.025	.29	1361	η Cephei	20 44	+61	.018	.16
1231	π Sagittarii	5	−21	.019	.23	1366	μ Aquarii	48	− 9	.016	.22
1255	λ Urs. Min.	7	+89	....	...	1364	β Indi	48	−59	.067	.58
1237	ψ Sagittarii	19 10	−25	.021	.31	1368	76 Draconis	20 49	+82	.022	.21

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Cat. No.	Name.	R. A. 1913.		Decl. 1913.	Mean Error 1920.		Cat. No.	Name.	R. A. 1913.		Decl. 1913.	Mean Error 1920.	
					α	δ						α	δ
		h	m	°	s	″			h	m	°	s	″
1369	32 Vulpeculæ	20	51	+28	.018	.22	1495	10 Lacertæ	22	35	+39	.027	.30
1371	220 Draco.(H′.)		52	+80	.021	.25	1497	ε Pisc. Aust.		36	−27	.028	.38
1373	ν Cygni		54	+41	.022	.22	1499	ζ Pegasi		37	+10	.013	.17
1372	α Octantis		54	−77	055	.46	1498	β Octantis		37	−82	.036	.30
1374	γ Microscop.	20	56	−33	.037	.49	1500	β Gruis		37	−47	.060	.46
1378	θ Capricorni	21	1	−18	.017	.22	1501	η Pegasi	22	39	+30	.017	.21
1380	ξ Cygni		2	+44	.018	.20	1504	λ Pegasi		42	+23	.016	.21
1381	61 Cygni *pr.*		3	+38	.020	.19	1505	ε Gruis		43	−52	.052	.48
1384	ν Aquarii		5	−12	.019	.28	1506	τ Aquarii		45	−14	.018	.24
1387	Br. 2777		7	+78	.023	.21	1507	μ Pegasi		46	+24	.016	.19
1386	3 Pisc. Aust.	21	8	−28	.032	.46	1510	ι Cephei	22	47	+66	.014	.17
1389	ζ Cygni		9	+30	.015	.18	1512	λ Aquarii		48	− 8	.013	.19
1391	τ Cygni		11	+38	.022	.22	1513	ρ Indi		49	−71	.051	.62
1392	α Equulei		11	+ 5	.015	.20	1514	δ Aquarii		50	−16	.019	.25
1394	σ Cygni		14	+39	.021	.28	1516	α Pisc. Aust.		53	−30	.032	.28
1396	θ^1 Microscop.	21	15	−41	.074	.80	1520	υ Androm.	22	58	+42	.017	.22
1397	α Cephei		16	+62	.016	.14	1523	β Pegasi	23	0	+28	.020	.21
1398	ι Capricorni		17	−17	.021	.25	1525	α Pegasi		0	+15	.010	.14
1399	1 Pegasi		18	+19	.020	.27	1528	55 Pegasi		3	+ 9	.029	.40
1400	γ Pavonis		19	−66	.061	.43	1531	c^2 Aquarii		5	−22	.023	.32
1403	ζ Capricorni	21	22	−23	.024	.31	1533	π Cephei	23	5	+75	.019	.21
1406	*g* Cygni		26	+46	.028	.29	1532	ι Gruis		5	−46	.064	.56
1407	β Aquarii		27	− 6	.018	.18	1534	59 Pegasi		7	+ 8	.028	.41
1409	β Cephei		28	+70	.014	.14	1535	5 Cassiop.(H′.)		9	+57	.030	.31
1415	ξ Aquarii		33	− 8	.016	.22	1536	φ Aquarii		10	− 7	.016	.22
1416	74 Cygni	21	33	+40	.029	.31	1537	ψ Aquarii	23	11	−10	.020	.29
1417	γ Capricorni		35	−17	.018	.26	1539	γ Tucanæ		12	−59	.044	.38
1418	λ Octantis		38	−83	.065	.51	1540	γ Piscium		13	+ 3	.013	.16
1424	ε Pegasi		40	+ 9	.012	.18	1542	γ Sculptoris		14	−33	.053	.46
1426	11 Cephei		41	+71	.028	.26	1544	ο Cephei		15	+68	.025	.25
1428	δ Capricorni	21	42	−17	.017	.21	1546	τ Pegasi	23	16	+23	.020	.25
1431	π^2 Cygni		44	+49	.022	.24	1548	b^1 Aquarii		18	−21	.024	.32
1433	μ Capricorni		49	−14	.016	.23	1550	4 Cassiop.		21	+62	.022	.23
1434	γ Gruis		49	−38	.064	.52	1549	υ Pegasi		21	+23	.020	.24
1435	16 Pegasi		49	+26	.018	.22	1552	κ Piscium		22	+ 1	.014	.19
1439	79 Draconis	21	52	+73	.023	.25	1553	θ Piscium	23	24	+ 6	.019	.26
1442	ε Indi		57	−57	.058	.80	1555	70 Pegasi		25	+12	.022	.26
1444	20 Pegasi	21	57	+13	.022	.25	1559	39 H. Cephei		28	+87	.018	.21
1449	α Aquarii	22	1	− 1	.010	.13	1558	β Sculptoris		28	−38	.046	.47
1450	ι Aquarii		2	−14	.020	.22	1561	72 Pegasi		30	+31	.026	.30
1452	20 Cephei	22	2	+62	.029	.29	1567	λ Androm.	23	33	+46	.016	.20
1451	α Gruis		3	−47	....	..	1568	ι Androm.		34	+43	.021	.21
1453	ι Pegasi		3	+25	.019	.21	1569	ι Piscium		35	+ 5	.013	.19
1456	θ Pegasi		6	+ 6	.017	.22	1570	γ Cephei		36	+77	.014	.14
1457	π Pegasi		6	+33	.022	.25	1572	κ Androm.		36	+44	.020	.23
1459	ζ Cephei	22	8	+58	.018	.18	1574	ω^2 Aquarii	23	38	−15	.023	.37
1460	24 Cephei		8	+72	.021	.22	1576	i^1 Aquarii		40	−19	.022	.27
1466	θ Aquarii		12	− 8	.013	.21	1577	ψ Androm.		42	+46	.023	.39
1467	α Tucanæ		13	−61	.041	.32	1580	41 H. Cephei		44	+67	.024	.27
1469	υ Octantis		15	−86	.026	.22	1581	δ Sculptoris		44	−29	.024	.33
1473	γ Aquarii	22	17	− 2	.013	.18	1582	γ^1 Octantis	23	47	−83	.032	.29
1474	31 Pegasi		17	+12	.024	.28	1583	φ Pegasi		48	+19	.023	.31
1477	3 Lacertæ		20	+52	.018	.20	1586	ρ Cassiop.		50	+57	.032	.28
1478	π Aquarii		21	+ 1	.018	.30	1587	Gr. 4163		51	+74	.032	.37
1483	σ Aquarii		26	−11	.016	.21	1592	ω Piscium		55	+ 6	.013	.16
1488	α Lacertæ	22	28	+50	.020	.19	1593	ε Tucanæ	23	55	−66	.071	.60
1489	υ Aquarii		30	−21	.026	.33	1595	30 Piscium		57	− 6	.022	.28
1491	226 B. Cephei		31	+76	.026	.25	1596	2 Ceti	23	59	−18	.018	.23
1490	η Aquarii	22	31	− 1	.013	.19							

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.		Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
		Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
		h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
Jan.	1	18 46 37.33	38.01	−23 1 12.9	12.2	11.044	+12.30	+ 3 39.61	16 17.89	1 11.05	18 42 57.78
	2	18 51 2.18	2.93	22 56 4.2	3.3	11.029	13.43	4 7.92	16 17.89	1 11.01	18 46 54.33
	3	18 55 26.69	27.53	22 50 27.9	26.8	11.014	14.57	4 35.89	16 17.88	1 10.96	18 50 50.89
	4	18 59 50.84	51.77	22 44 24.3	23.0	10.998	15.71	5 3.50	16 17.87	1 10.91	18 54 47.45
	5	19 4 14.60	15.60	22 37 53.6	52.1	10.981	16.84	5 30.71	16 17.85	1 10.85	18 58 44.01
	6	19 8 37.93	39.00	−22 30 56.0	54.3	10.962	+17.96	+ 5 57.48	16 17.83	1 10.79	19 2 40.57
	7	19 13 0.79	1.94	22 23 31.7	29.8	10.942	19.07	6 23.78	16 17.80	1 10.72	19 6 37.13
	8	19 17 23.15	24.38	22 15 40.9	38.7	10.920	20.16	6 49.58	16 17.77	1 10.65	19 10 33.69
	9	19 21 44.98	46.29	22 7 23.9	21.4	10.898	21.25	7 14.85	16 17.74	1 10.58	19 14 30.24
	10	19 26 6.26	7.64	21 58 40.8	38.0	10.875	22.33	7 39.57	16 17.71	1 10.50	19 18 26.80
	11	19 30 26.96	28.41	−21 49 32.0	28.9	10.850	+23.40	+ 8 3.72	16 17.67	1 10.42	19 22 23.36
	12	19 34 47.05	48.57	21 39 57.8	54.3	10.824	24.45	8 27.26	16 17.62	1 10.34	19 26 19.92
	13	19 39 6.51	8.10	21 29 58.3	54.5	10.797	25.49	8 50.16	16 17.57	1 10.26	19 30 16.48
	14	19 43 25.31	26.96	21 19 34.0	29.9	10.770	26.52	9 12.41	16 17.51	1 10.17	19 34 13.04
	15	19 47 43.44	45.15	21 8 45.1	40.8	10.741	27.54	9 33.98	16 17.45	1 10.08	19 38 9.60
	16	19 52 0.88	2.65	−20 57 32.0	27.3	10.712	+28.54	+ 9 54.86	16 17.39	1 9.99	19 42 6.15
	17	19 56 17.61	19.43	20 45 55.0	49.9	10.682	29.53	10 15.03	16 17.33	1 9.89	19 46 2.71
	18	20 0 33.61	35.48	20 33 54.5	49.0	10.651	30.51	10 34.47	16 17.25	1 9.79	19 49 59.27
	19	20 4 48.86	50.78	20 21 30.7	24.9	10.620	31.46	10 53.17	16 17.17	1 9.69	19 53 55.83
	20	20 9 3.36	5.33	20 8 44.0	37.9	10.588	32.41	11 11.11	16 17.08	1 9.58	19 57 52.38
	21	20 13 17.10	19.11	−19 55 34.7	28.3	10.556	+33.35	+11 28.29	16 16.99	1 9.48	20 1 48.94
	22	20 17 30.08	32.13	19 41 63.2	56.4	10.524	34.27	11 44.71	16 16.89	1 9.38	20 5 45.50
	23	20 21 42.28	44.38	19 28 9.7	2.6	10.492	35.17	12 0.35	16 16.79	1 9.27	20 9 42.06
	24	20 25 53.70	55.84	19 13 54.7	47.3	10.460	36.07	12 15.21	16 16.67	1 9.16	20 13 38.62
	25	20 30 4.34	6.51	18 59 18.6	10.9	10.427	36.94	12 29.29	16 16.55	1 9.05	20 17 35.17
	26	20 34 14.20	16.40	−18 44 21.6	13.6	10.394	+37.80	+12 42.59	16 16.43	1 8.94	20 21 31.73
	27	20 38 23.28	25.51	18 28 64.1	55.8	10.361	38.65	12 55.10	16 16.31	1 8.83	20 25 28.29
	28	20 42 31.56	33.82	18 13 26.4	17.8	10.328	39.48	13 6.82	16 16.17	1 8.72	20 29 24.84
	29	20 46 39.04	41.33	17 57 29.1	20.2	10.295	40.29	13 17.75	16 16.03	1 8.60	20 33 21.40
	30	20 50 45.73	48.04	17 41 12.4	3.2	10.262	41.09	13 27.87	16 15.89	1 8.49	20 37 17.96
	31	20 54 51.61	53.94	−17 24 36.6	27.2	10.229	+41.88	+13 37.19	16 15.75	1 8.37	20 41 14.52
Feb.	1	20 58 56.69	59.03	17 7 42.2	32.6	10.195	42.64	13 45.70	16 15.60	1 8.25	20 45 11.07
	2	21 3 0.96	3.31	16 50 29.7	19.9	10.161	43.39	13 53.40	16 15.45	1 8.13	20 49 7.63
	3	21 7 4.42	6.78	16 32 59.6	49.5	10.127	44.12	14 0.30	16 15.29	1 8.02	20 53 4.19
	4	21 11 7.07	9.44	16 15 12.2	1.7	10.094	44.83	14 6.39	16 15.13	1 7.90	20 57 0.74
	5	21 15 8.91	11.29	−15 56 67.8	57.0	10.060	+45.53	+14 11.67	16 14.97	1 7.79	21 0 57.30
	6	21 19 9.94	12.33	15 38 46.9	36.0	10.026	46.20	14 16.13	16 14.80	1 7.67	21 4 53.86
	7	21 23 10.15	12.55	15 19 70.0	58.9	9.992	46.86	14 19.78	16 14.63	1 7.56	21 8 50.41
	8	21 27 9.56	11.96	15 1 17.5	6.2	9.959	47.50	14 22.63	16 14.46	1 7.44	21 12 46.97
	9	21 31 8.17	10.56	14 41 69.9	58.4	9.925	48.12	14 24.67	16 14.28	1 7.33	21 16 43.52
	10	21 35 5.98	8.36	−14 22 47.5	35.8	9.892	+48.73	+14 25.90	16 14.10	1 7.22	21 20 40.08
	11	21 39 2.99	5.37	14 2 70.9	59.0	9.859	49.31	14 26.35	16 13.93	1 7.11	21 24 36.64
	12	21 42 59.21	61.59	13 43 20.4	8.4	9.826	49.88	14 26.02	16 13.75	1 7.00	21 28 33.19
	13	21 46 54.66	57.03	13 23 16.5	4.3	9.794	50.43	14 24.91	16 13.56	1 6.89	21 32 29.75
	14	21 50 49.35	51.70	13 2 59.6	47.3	9.763	50.96	14 23.03	16 13.37	1 6.79	21 36 26.30
	15	21 54 43.28	45.61	−12 42 30.1	17.8	9.732	+51.48	+14 20.39	16 13.18	1 6.69	21 40 22.86
	16	21 58 36.46	38.77	−12 21 48.5	36.2	9.701	+51.97	+14 17.00	16 12.98	1 6.59	21 44 19.41

NOTE.—For mean time interval of semidiameter passing meridian, subtract $0^{s}.19$ from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Decli-nation.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
Feb. 16	21 58 36.46	38.77	−12 21 48.5	36.2	9.701	+51.97	+14 17.00	16 12.98	1 6.59	21 44 19.41
17	22 2 28.91	31.20	12 0 55.3	42.9	9.671	52.45	14 12.88	16 12.78	1 6.49	21 48 15.97
18	22 6 20.64	22.91	11 39 50.7	38.3	9.641	52.92	14 8.06	16 12.57	1 6.39	21 52 12.52
19	22 10 11.67	13.92	11 18 35.2	22.8	9.612	53.36	14 2.54	16 12.36	1 6.29	21 56 9.08
20	22 14 2.02	4.24	10 56 69.2	56.7	9.584	53.80	13 56.33	16 12.15	1 6.19	22 0 5.63
21	22 17 51.70	53.89	−10 35 33.0	20.5	9.557	+54.21	+13 49.45	16 11.93	1 6.09	22 4 2.19
22	22 21 40.74	42.91	10 13 47.0	34.5	9.531	54.60	13 41.93	16 11.71	1 6.00	22 7 58.74
23	22 25 29.17	31.31	9 51 51.6	39.1	9.506	54.99	13 33.79	16 11.48	1 5.91	22 11 55.30
24	22 29 16.99	19.11	9 29 47.1	34.7	9.481	55.37	13 25.05	16 11.25	1 5.82	22 15 51.85
25	22 33 4.23	6.32	9 7 33.9	21.6	9.457	55.72	13 15.73	16 11.01	1 5.73	22 19 48.41
26	22 36 50.90	52.96	− 8 45 12.6	0.3	9.433	+56.06	+13 5.84	16 10.77	1 5.65	22 23 44.96
27	22 40 37.03	39.06	8 22 43.4	31.2	9.411	56.38	12 55.40	16 10.52	1 5.57	22 27 41.52
28	22 44 22.63	24.63	7 59 66.6	54.5	9.390	56.68	12 44.44	16 10.28	1 5.49	22 31 38.07
Mar. 1	22 48 7.71	9.68	7 37 22.7	10.7	9.368	56.97	12 32.98	16 10.03	1 5.42	22 35 34.62
2	22 51 52.29	54.22	7 14 32.2	20.3	9.347	57.24	12 21.02	16 9.79	1 5.35	22 39 31.18
3	22 55 36.39	38.28	− 6 51 35.4	23.7	9.327	+57.49	+12 8.57	16 9.54	1 5.28	22 43 27.73
4	22 59 20.04	21.89	6 28 32.7	21.2	9.308	57.73	11 55.66	16 9.28	1 5.21	22 47 24.29
5	23 3 3.24	5.05	6 5 24.5	13.2	9.290	57.95	11 42.31	16 9.03	1 5.14	22 51 20.84
6	23 6 46.01	47.78	5 42 11.2	0.1	9.273	58.15	11 28.52	16 8.77	1 5.08	22 55 17.39
7	23 10 28.36	30.10	5 18 53.2	42.4	9.257	58.34	11 14.32	16 8.51	1 5.02	22 59 13.95
8	23 14 10.32	12.03	− 4 55 31.1	20.5	9.241	+58.50	+10 59.71	16 8.25	1 4.96	23 3 10.50
9	23 17 51.90	53.57	4 31 65.2	54.8	9.225	58.65	10 44.73	16 8.00	1 4.91	23 7 7.06
10	23 21 33.12	34.74	4 8 35.9	25.6	9.210	58.79	10 29.39	16 7.74	1 4.86	23 11 3.61
11	23 25 13.99	15.56	3 44 63.5	53.4	9.196	58.91	10 13.71	16 7.48	1 4.81	23 15 0.16
12	23 28 54.52	56.05	3 21 28.4	18.6	9.182	59.01	9 57.70	16 7.22	1 4.76	23 18 56.72
13	23 32 34.74	36.23	− 2 57 51.1	41.5	9.169	+59.08	+ 9 41.37	16 6.96	1 4.71	23 22 53.27
14	23 36 14.67	16.12	2 34 12.0	2.6	9.157	59.15	9 24.74	16 6.70	1 4.67	23 26 49.83
15	23 39 54.34	55.73	2 10 31.5	22.4	9.147	59.21	9 7.85	16 6.44	1 4.63	23 30 46.38
16	23 43 33.75	35.09	1 46 50.0	41.2	9.137	59.24	8 50.71	16 6.18	1 4.60	23 34 42.93
17	23 47 12.92	14.22	1 22 67.8	59.3	9.128	59.26	8 33.33	16 5.91	1 4.57	23 38 39.49
18	23 50 51.87	53.14	− 0 59 25.2	17.0	9.119	+59.27	+ 8 15.74	16 5.65	1 4.54	23 42 36.04
19	23 54 30.64	31.86	0 35 42.6	34.8	9.112	59.26	7 57.95	16 5.38	1 4.52	23 46 32.59
20	23 58 9.25	10.41	− 0 11 60.4	52.9	9.105	59.24	7 40.00	16 5.11	1 4.50	23 50 29.15
21	0 1 47.71	48.82	+ 0 11 41.0	48.2	9.100	59.21	7 21.91	16 4.84	1 4.48	23 54 25.70
22	0 5 26.05	27.12	0 35 21.4	28.4	9.096	59.16	7 3.71	16 4.57	1 4.47	23 58 22.26
23	0 9 4.30	5.32	+ 0 59 0.5	7.3	9.093	+59.10	+ 6 45.41	16 4.29	1 4.46	0 2 18.81
24	0 12 42.48	43.45	1 22 38.0	44.5	9.091	59.02	6 27.04	16 4.01	1 4.45	0 6 15.36
25	0 16 20.61	21.53	1 46 13.5	19.7	9.089	58.93	6 8.62	16 3.73	1 4.45	0 10 11.92
26	0 19 58.72	59.60	2 9 46.7	52.6	9.088	58.83	5 50.18	16 3.45	1 4.44	0 14 8.47
27	0 23 36.84	37.68	2 33 17.3	22.8	9.089	58.71	5 31.75	16 3.17	1 4.44	0 18 5.02
28	0 27 14.99	15.78	+ 2 56 44.9	50.0	9.090	+58.58	+ 5 13.34	16 2.89	1 4.44	0 22 1.58
29	0 30 53.18	53.92	3 20 9.1	13.9	9.093	58.43	4 54.98	16 2.60	1 4.44	0 25 58.13
30	0 34 31.42	32.12	3 43 29.6	34.1	9.096	58.27	4 36.68	16 2.32	1 4.45	0 29 54.68
31	0 38 9.75	10.40	4 6 46.1	50.2	9.099	58.10	4 18.46	16 2.03	1 4.46	0 33 51.24
Apr. 1	0 41 48.18	48.78	4 29 58.1	61.9	9.103	57.91	4 0.34	16 1.75	1 4.47	0 37 47.79
2	0 45 26.72	27.28	+ 4 53 5.4	8.9	9.108	+57.70	+ 3 42.34	16 1.47	1 4.49	0 41 44.35
3	0 49 5.40	5.93	+ 5 16 7.5	10.8	9.114	+57.47	+ 3 24.47	16 1.19	1 4.51	0 45 40.90

NOTE.—For mean time interval of semidiameter passing meridian, subtract $0^s.18$ from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
Apr. 1	0 41 48.18	48.78	+ 4 29 58.1	61.9	9.103	+57.91	+4 0.34	16 1.75	1 4.47	0 37 47.79
2	0 45 26.72	27.28	4 53 5.4	8.9	9.108	57.70	3 42.34	16 1.47	1 4.49	0 41 44.35
3	0 49 5.40	5.93	5 16 7.5	10.8	9.114	57.47	3 24.47	16 1.19	1 4.51	0 45 40.90
4	0 52 44.24	44.73	5 39 4.2	7.1	9.121	57.23	3 6.76	16 0.91	1 4.53	0 49 37.45
5	0 56 23.25	23.70	6 1 54.9	57.5	9.129	56.98	2 49.21	16 0.63	1 4.56	0 53 34.01
6	1 0 2.45	2.84	+ 6 24 39.4	41.8	9.137	+56.72	+2 31.85	16 0.35	1 4.59	0 57 30.56
7	1 3 41.84	42.18	6 47 17.4	19.5	9.146	56.44	2 14.69	16 0.07	1 4.62	1 1 27.12
8	1 7 21.45	21.75	7 9 48.4	50.2	9.155	56.13	1 57.75	15 59.80	1 4.66	1 5 23.67
9	1 11 1.29	1.55	7 32 12.0	13.5	9.165	55.82	1 41.04	15 59.53	1 4.70	1 9 20.22
10	1 14 41.36	41.58	7 54 27.9	29.2	9.175	55.50	1 24.57	15 59.26	1 4.74	1 13 16.78
11	1 18 21.69	21.86	+ 8 16 35.7	36.8	9.186	+55.15	+1 8.35	15 59.00	1 4.78	1 17 13.33
12	1 22 2.29	2.42	8 38 35.2	35.9	9.198	54.79	0 52.40	15 58.73	1 4.82	1 21 9.89
13	1 25 43.18	43.28	9 0 25.8	26.2	9.210	54.42	0 36.73	15 58.47	1 4.86	1 25 6.44
14	1 29 24.38	24.44	9 22 7.3	7.5	9.223	54.03	0 21.36	15 58.20	1 4.91	1 29 3.00
15	1 33 5.89	5.91	9 43 39.4	39.4	9.237	53.63	+0 6.32	15 57.94	1 4.96	1 32 59.55
16	1 36 47.73	47.71	+10 5 1.6	1.5	9.251	+53.22	−0 8.38	15 57.68	1 5.01	1 36 56.10
17	1 40 29.92	29.86	10 26 13.8	13.5	9.265	52.79	0 22.73	15 57.42	1 5.06	1 40 52.66
18	1 44 12.48	12.38	10 47 15.6	15.1	9.281	52.36	0 36.72	15 57.16	1 5.12	1 44 49.22
19	1 47 55.42	55.29	11 8 6.7	6.0	9.298	51.90	0 50.33	15 56.90	1 5.18	1 48 45.77
20	1 51 38.77	38.60	11 28 46.8	45.9	9.315	51.44	1 3.54	15 56.64	1 5.24	1 52 42.32
21	1 55 22.54	22.34	+11 49 15.7	14.6	9.333	+50.96	−1 16.33	15 56.38	1 5.30	1 56 38.88
22	1 59 6.74	6.52	12 9 32.9	31.7	9.351	50.47	1 28.69	15 56.12	1 5.37	2 0 35.44
23	2 2 51.40	51.15	12 29 38.2	36.8	9.370	49.97	1 40.59	15 55.86	1 5.44	2 4 31.99
24	2 6 36.53	36.25	12 49 31.2	29.7	9.390	49.46	1 52.01	15 55.61	1 5.50	2 8 28.54
25	2 10 22.15	21.83	13 9 11.7	10.1	9.411	48.92	2 2.94	15 55.35	1 5.57	2 12 25.10
26	2 14 8.26	7.91	+13 28 39.5	37.7	9.432	+48.38	−2 13.38	15 55.10	1 5.64	2 16 21.66
27	2 17 54.88	54.50	13 47 54.2	52.3	9.454	47.83	2 23.32	15 54.85	1 5.71	2 20 18.21
28	2 21 42.02	41.61	14 6 55.3	53.3	9.476	47.26	2 32.73	15 54.60	1 5.78	2 24 14.77
29	2 25 29.69	29.26	14 25 42.5	40.4	9.498	46.67	2 41.61	15 54.35	1 5.86	2 28 11.32
30	2 29 17.90	17.45	14 44 15.6	13.4	9.520	46.08	2 49.96	15 54.10	1 5.94	2 32 7.88
May 1	2 33 6.65	6.18	+15 2 34.3	32.1	9.543	+45.47	−2 57.76	15 53.85	1 6.02	2 36 4.44
2	2 36 55.96	55.47	15 20 38.2	35.9	9.566	44.84	3 5.02	15 53.61	1 6.10	2 40 0.99
3	2 40 45.82	45.31	15 38 26.9	24.5	9.589	44.20	3 11.72	15 53.37	1 6.18	2 43 57.55
4	2 44 36.24	35.71	15 55 60.1	57.7	9.612	43.55	3 17.86	15 53.14	1 6.26	2 47 54.10
5	2 48 27.22	26.68	16 13 17.5	15.1	9.636	42.89	3 23.43	15 52.91	1 6.34	2 51 50.66
6	2 52 18.77	18.21	+16 30 18.8	16.3	9.659	+42.21	−3 28.43	15 52.68	1 6.42	2 55 47.22
7	2 56 10.88	10.31	16 47 3.6	1.0	9.683	41.52	3 32.87	15 52.46	1 6.50	2 59 43.77
8	3 0 3.55	2.97	17 3 31.5	29.0	9.706	40.81	3 36.75	15 52.25	1 6.58	3 3 40.33
9	3 3 56.79	56.20	17 19 42.4	39.9	9.730	40.08	3 40.07	15 52.04	1 6.67	3 7 36.88
10	3 7 50.59	49.99	17 35 35.9	33.4	9.754	39.35	3 42.83	15 51.83	1 6.76	3 11 33.44
11	3 11 44.95	44.34	+17 51 11.6	9.2	9.777	+38.61	−3 45.04	15 51.62	1 6.84	3 15 30.00
12	3 15 39.87	39.25	18 6 29.2	26.8	9.800	37.86	3 46.69	15 51.42	1 6.92	3 19 26.56
13	3 19 35.34	34.72	18 21 28.5	26.1	9.823	37.08	3 47.78	15 51.22	1 7.00	3 23 23.11
14	3 23 31.36	30.74	18 36 9.2	6.8	9.846	36.30	3 48.31	15 51.02	1 7.09	3 27 19.67
15	3 27 27.93	27.31	18 50 31.0	28.7	9.869	35.51	3 48.29	15 50.82	1 7.17	3 31 16.22
16	3 31 25.06	24.43	+19 4 33.7	31.5	9.892	+34.71	−3 47.72	15 50.63	1 7.25	3 35 12.78
17	3 35 22.73	22.10	+19 18 17.1	14.9	9.915	+33.89	−3 46.61	15 50.44	1 7.33	3 39 9.34

NOTE.—For mean time interval of semidiameter passing meridian, subtract $0^s.18$ from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
May 17	3 35 22.73	22.10	+19 18 17.1	14.9	9.915	+33.89	−3 46.61	15 50.44	1 7.33	3 39 9.34
18	3 39 20.95	20.33	19 31 40.9	38.7	9.938	33.07	3 44.95	15 50.25	1 7.41	3 43 5.90
19	3 43 19.73	19.11	19 44 44.7	42.7	9.960	32.24	3 42.74	15 50.07	1 7.49	3 47 2.45
20	3 47 19.05	18.44	19 57 28.4	26.5	9.983	31.40	3 39.98	15 49.88	1 7.56	3 50 59.01
21	3 51 18.91	18.32	20 9 51.8	49.9	10.006	30.55	3 36.67	15 49.70	1 7.64	3 54 55.57
22	3 55 19.32	18.73	+20 21 54.6	52.8	10.029	+29.68	−3 32.81	15 49.52	1 7.71	3 58 52.13
23	3 59 20.27	19.69	20 33 36.6	34.9	10.051	28.81	3 28.42	15 49.35	1 7.78	4 2 48.68
24	4 3 21.75	21.18	20 44 57.6	56.0	10.073	27.93	3 23.50	15 49.17	1 7.85	4 6 45.24
25	4 7 23.75	23.20	20 55 57.2	55.7	10.094	27.04	3 18.06	15 49.00	1 7.92	4 10 41.80
26	4 11 26.27	25.74	21 6 35.3	33.9	10.115	26.14	3 12.10	15 48.83	1 7.99	4 14 38.36
27	4 15 29.30	28.78	+21 16 51.7	50.4	10.136	+25.22	−3 5.63	15 48.67	1 8.06	4 18 34.92
28	4 19 32.82	32.32	21 26 46.1	44.9	10.156	24.30	2 58.66	15 48.51	1 8.13	4 22 31.47
29	4 23 36.82	36.34	21 36 18.3	17.2	10.176	23.37	2 51.22	15 48.36	1 8.19	4 26 28.03
30	4 27 41.29	40.83	21 45 28.1	27.1	10.195	22.44	2 43.31	15 48.21	1 8.25	4 30 24.59
31	4 31 46.21	45.77	21 54 15.3	14.4	10.214	21.49	2 34.95	15 48.06	1 8.31	4 34 21.15
June 1	4 35 51.57	51.15	+22 2 39.7	38.8	10.232	+20.53	−2 26.16	15 47.91	1 8.37	4 38 17.70
2	4 39 57.34	56.95	22 10 41.0	40.2	10.248	19.57	2 16.95	15 47.77	1 8.42	4 42 14.26
3	4 44 3.50	3.14	22 18 19.1	18.4	10.264	18.60	2 7.33	15 47.64	1 8.48	4 46 10.82
4	4 48 10.05	9.71	22 25 33.9	33.3	10.279	17.62	1 57.34	15 47.51	1 8.53	4 50 7.38
5	4 52 16.95	16.64	22 32 25.1	24.6	10.294	16.64	1 47.00	15 47.38	1 8.58	4 54 3.94
6	4 56 24.18	23.90	+22 38 52.6	52.1	10.307	+15.65	−1 36.34	15 47.27	1 8.63	4 58 0.50
7	5 0 31.70	31.46	22 44 56.2	55.8	10.319	14.65	1 25.37	15 47.16	1 8.67	5 1 57.05
8	5 4 39.50	39.30	22 50 35.9	35.5	10.330	13.65	1 14.11	15 47.05	1 8.71	5 5 53.61
9	5 8 47.57	47.40	22 55 51.4	51.2	10.341	12.64	1 2.60	15 46.95	1 8.75	5 9 50.17
10	5 12 55.88	55.74	23 0 42.7	42.6	10.350	11.63	0 50.86	15 46.85	1 8.78	5 13 46.73
11	5 17 4.40	4.29	+23 5 9.7	9.6	10.358	+10.62	−0 38.91	15 46.76	1 8.81	5 17 43.29
12	5 21 13.10	13.02	23 9 12.3	12.2	10.365	9.60	0 26.76	15 46.67	1 8.84	5 21 39.85
13	5 25 21.97	21.92	23 12 50.4	50.4	10.372	8.58	0 14.44	15 46.58	1 8.86	5 25 36.40
14	5 29 30.99	30.97	23 16 4.0	4.0	10.378	7.56	−0 1.98	15 46.50	1 8.88	5 29 32.96
15	5 33 40.13	40.15	23 18 53.0	53.0	10.384	6.53	+0 10.60	15 46.42	1 8.90	5 33 29.52
16	5 37 49.38	49.44	+23 21 17.3	17.3	10.388	+ 5.50	+0 23.29	15 46.35	1 8.92	5 37 26.08
17	5 41 58.72	58.82	23 23 16.9	16.9	10.391	4.47	0 36.07	15 46.28	1 8.93	5 41 22.64
18	5 46 8.13	8.26	23 24 51.9	51.9	10.393	3.44	0 48.93	15 46.21	1 8.94	5 45 19.20
19	5 50 17.59	17.76	23 26 2.2	2.2	10.395	2.41	1 1.84	15 46.14	1 8.94	5 49 15.76
20	5 54 27.08	27.29	23 26 47.7	47.7	10.396	1.38	1 14.77	15 46.08	1 8.94	5 53 12.32
21	5 58 36.58	36.83	+23 27 8.4	8.4	10.396	+ 0.35	+1 27.71	15 46.03	1 8.94	5 57 8.88
22	6 2 46.07	46.36	23 27 4.4	4.4	10.395	− 0.68	1 40.65	15 45.97	1 8.94	6 1 5.43
23	6 6 55.54	55.86	23 26 35.6	35.6	10.393	1.72	1 53.56	15 45.92	1 8.94	6 5 1.99
24	6 11 4.95	5.31	23 25 42.0	42.0	10.390	2.75	2 6.41	15 45.87	1 8.93	6 8 58.55
25	6 15 14.29	14.69	23 24 23.7	23.6	10.386	3.78	2 19.19	15 45.82	1 8.92	6 12 55.11
26	6 19 23.53	23.97	+23 22 40.7	40.5	10.381	− 4.81	+2 31.88	15 45.78	1 8.90	6 16 51.67
27	6 23 32.66	33.13	23 20 33.0	32.8	10.376	5.83	2 44.46	15 45.75	1 8.87	6 20 48.23
28	6 27 41.64	42.15	23 18 0.8	0.5	10.370	6.86	2 56.89	15 45.72	1 8.84	6 24 44.78
29	6 31 50.46	51.01	23 15 4.0	3.6	10.363	7.88	3 9.15	15 45.70	1 8.81	6 28 41.34
30	6 35 59.09	59.68	23 11 42.6	42.1	10.355	8.90	3 21.22	15 45.68	1 8.78	6 32 37.90
July 1	6 40 7.51	8.13	+23 7 56.8	56.2	10.346	− 9.92	+3 33.08	15 45.66	1 8.75	6 36 34.46
2	6 44 15.69	16.34	+23 3 46.7	45.9	10.335	−10.93	+3 44.71	15 45.65	1 8.72	6 40 31.02

NOTE.—For mean time interval of semidiameter passing meridian, subtract $0^{s}.19$ from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
July 1	6 40 7.51	8.13	+23 7 56.8	56.2	10.346	− 9.92	+3 33.08	15 45.66	1 8.75	6 36 34.46
2	6 44 15.69	16.34	23 3 46.7	45.9	10.335	10.93	3 44.71	15 45.65	1 8.72	6 40 31.02
3	6 48 23.60	24.28	22 59 12.3	11.4	10.323	11.93	3 56.06	15 45.64	1 8.68	6 44 27.58
4	6 52 31.23	31.94	22 54 13.8	12.9	10.311	12.93	4 7.12	15 45.64	1 8.64	6 48 24.14
5	6 56 38.54	39.28	22 48 51.4	50.4	10.297	13.93	4 17.87	15 45.65	1 8.60	6 52 20.70
6	7 0 45.50	46.27	+22 43 5.2	4.2	10.282	−14.92	+4 28.29	15 45.66	1 8.55	6 56 17.25
7	7 4 52.10	52.90	22 36 55.3	54.2	10.267	15.90	4 38.33	15 45.68	1 8.50	7 0 13.81
8	7 8 58.32	59.14	22 30 21.8	20.5	10.250	16.88	4 47.98	15 45.70	1 8.45	7 4 10.37
9	7 13 4.12	4.97	22 23 25.0	23.5	10.233	17.85	4 57.22	15 45.73	1 8.39	7 8 6.93
10	7 17 9.50	10.37	22 16 5.0	3.4	10.215	18.81	5 6.04	15 45.77	1 8.33	7 12 3.49
11	7 21 14.44	15.33	+22 8 22.1	20.4	10.196	−19.76	+5 14.41	15 45.81	1 8.27	7 16 0.04
12	7 25 18.91	19.82	22 0 16.4	14.6	10.177	20.71	5 22.32	15 45.85	1 8.21	7 19 56.60
13	7 29 22.90	23.83	21 51 48.2	46.2	10.157	21.64	5 29.76	15 45.89	1 8.15	7 23 53.16
14	7 33 26.40	27.35	21 42 57.6	55.4	10.136	22.56	5 36.71	15 45.94	1 8.08	7 27 49.72
15	7 37 29.41	30.37	21 33 44.8	42.5	10.115	23.48	5 43.15	15 46.00	1 8.01	7 31 46.28
16	7 41 31.91	32.89	+21 24 10.0	7.6	10.093	−24.39	+5 49.09	15 46.06	1 7.94	7 35 42.84
17	7 45 33.89	34.88	21 14 13.4	10.9	10.071	25.30	5 54.52	15 46.12	1 7.86	7 39 39.39
18	7 49 35.35	36.34	21 3 55.2	52.6	10.049	26.20	5 59.42	15 46.18	1 7.79	7 43 35.95
19	7 53 36.28	37.28	20 53 15.6	13.0	10.027	27.09	6 3.79	15 46.24	1 7.71	7 47 32.51
20	7 57 36.67	37.69	20 42 14.9	12.2	10.005	27.96	6 7.62	15 46.30	1 7.63	7 51 29.06
21	8 1 36.52	37.55	+20 30 53.4	50.5	9.982	−28.82	+6 10.91	15 46.38	1 7.55	7 55 25.62
22	8 5 35.81	36.85	20 19 11.2	8.1	9.959	29.68	6 13.65	15 46.46	1 7.47	7 59 22.18
23	8 9 34.55	35.59	20 7 8.5	5.3	9.936	30.53	6 15.83	15 46.54	1 7.39	8 3 18.74
24	8 13 32.73	33.77	19 54 45.5	42.2	9.913	31.37	6 17.45	15 46.62	1 7.30	8 7 15.30
25	8 17 30.34	31.38	19 41 62.6	59.2	9.889	32.20	6 18.49	15 46.71	1 7.22	8 11 11.85
26	8 21 27.38	28.42	+19 28 59.9	56.5	9.865	−33.01	+6 18.97	15 46.80	1 7.13	8 15 8.41
27	8 25 23.84	24.88	19 15 37.8	34.3	9.841	33.82	6 18.88	15 46.90	1 7.05	8 19 4.97
28	8 29 19.73	20.76	19 1 56.6	53.0	9.817	34.62	6 18.21	15 47.00	1 6.96	8 23 1.52
29	8 33 15.03	16.06	18 47 56.4	52.7	9.792	35.39	6 16.95	15 47.10	1 6.88	8 26 58.08
30	8 37 9.74	10.76	18 33 37.5	33.8	9.768	36.16	6 15.10	15 47.21	1 6.79	8 30 54.64
31	8 41 3.86	4.87	+18 18 60.2	56.4	9.743	−36.93	+6 12.66	15 47.33	1 6.71	8 34 51.20
Aug. 1	8 44 57.38	58.38	18 4 4.8	0.9	9.718	37.68	6 9.62	15 47.45	1 6.62	8 38 47.75
2	8 48 50.30	51.28	17 48 51.6	47.7	9.692	38.41	6 5.97	15 47.57	1 6.53	8 42 44.31
3	8 52 42.61	43.58	17 33 21.0	17.2	9.666	39.13	6 1.72	15 47.70	1 6.44	8 46 40.86
4	8 56 34.31	35.26	17 17 33.3	29.5	9.641	39.84	5 56.87	15 47.84	1 6.35	8 50 37.42
5	9 0 25.39	26.33	+17 1 28.8	24.9	9.615	−40.54	+5 51.40	15 47.98	1 6.26	8 54 33.98
6	9 4 15.86	16.78	16 45 7.8	3.9	9.590	41.21	5 45.31	15 48.13	1 6.17	8 58 30.54
7	9 8 5.72	6.62	16 28 30.7	26.7	9.565	41.88	5 38.61	15 48.28	1 6.09	9 2 27.09
8	9 11 54.97	55.85	16 11 37.7	33.7	9.540	42.54	5 31.30	15 48.43	1 6.00	9 6 23.65
9	9 15 43.62	44.48	15 54 29.1	25.2	9.515	43.17	5 23.39	15 48.58	1 5.92	9 10 20.20
10	9 19 31.67	32.50	+15 37 5.3	1.5	9.490	−43.80	+5 14.88	15 48.75	1 5.84	9 14 16.76
11	9 23 19.12	19.92	15 19 26.6	22.8	9.465	44.42	5 5.77	15 48.92	1 5.76	9 18 13.32
12	9 27 5.99	6.76	15 1 33.3	29.6	9.441	45.02	4 56.09	15 49.09	1 5.68	9 22 9.87
13	9 30 52.30	53.04	14 43 25.7	22.1	9.418	45.60	4 45.84	15 49.26	1 5.60	9 26 6.43
14	9 34 38.05	38.76	14 25 4.1	0.6	9.395	46.18	4 35.02	15 49.44	1 5.52	9 30 2.98
15	9 38 23.25	23.93	+14 6 28.8	25.4	9.372	−46.75	+4 23.66	15 49.62	1 5.44	9 33 59.54
16	9 42 7.91	8.56	+13 47 40.1	36.8	9.350	−47.31	+4 11.77	15 49.80	1 5.36	9 37 56.10

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0^{s}.19 from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
Aug. 16	9 42 7.91	8.56	+13 47 40.1	36.8	9.350	−47.31	+ 4 11.77	15 49.80	1 5.36	9 37 56.10
17	9 45 52.04	52.66	13 28 38.2	35.0	9.329	47.84	3 59.36	15 49.98	1 5.29	9 41 52.65
18	9 49 35.67	36.25	13 9 23.4	20.3	9.308	48.38	3 46.44	15 50.16	1 5.22	9 45 49.21
19	9 53 18.81	19.35	12 49 56.1	53.1	9.288	48.89	3 33.02	15 50.34	1 5.15	9 49 45.76
20	9 57 1.47	1.98	12 30 16.6	13.8	9.268	49.40	3 19.12	15 50.53	1 5.08	9 53 42.32
21	10 0 43.67	44.14	+12 10 25.1	22.6	9.249	−49.89	+ 3 4.76	15 50.72	1 5.01	9 57 38.87
22	10 4 25.41	25.84	11 50 22.0	19.6	9.230	50.37	2 49.95	15 50.91	1 4.94	10 1 35.43
23	10 8 6.71	7.10	11 30 7.5	5.3	9.212	50.84	2 34.70	15 51.11	1 4.87	10 5 31.98
24	10 11 47.59	47.94	11 9 42.0	40.0	9.195	51.28	2 19.03	15 51.31	1 4.81	10 9 28.54
25	10 15 28.06	28.37	10 49 5.7	3.9	9.179	51.72	2 2.95	15 51.51	1 4.75	10 13 25.09
26	10 19 8.14	8.41	+10 28 19.0	17.4	9.163	−52.16	+ 1 46.47	15 51.71	1 4.69	10 17 21.65
27	10 22 47.84	48.07	10 7 22.1	20.8	9.147	52.58	1 29.62	15 51.92	1 4.63	10 21 18.20
28	10 26 27.18	27.37	9 46 15.5	14.4	9.132	52.97	1 12.41	15 52.13	1 4.57	10 25 14.76
29	10 30 6.17	6.31	9 24 59.4	58.6	9.117	53.36	0 54.85	15 52.35	1 4.52	10 29 11.31
30	10 33 44.82	44.91	9 3 34.2	33.7	9.103	53.73	0 36.95	15 52.57	1 4.47	10 33 7.86
31	10 37 23.14	23.19	+ 8 42 0.3	0.1	9.090	−54.08	+ 0 18.72	15 52.79	1 4.42	10 37 4.42
Sept. 1	10 41 1.15	1.15	8 20 18.0	18.0	9.077	54.43	+ 0 0.17	15 53.02	1 4.37	10 41 0.97
2	10 44 38.85	38.79	7 58 27.7	27.9	9.064	54.76	− 0 18.68	15 53.25	1 4.33	10 44 57.53
3	10 48 16.25	16.15	7 36 29.7	30.2	9.053	55.06	0 37.83	15 53.48	1 4.29	10 48 54.08
4	10 51 53.37	53.23	7 14 24.3	25.2	9.042	55.36	0 57.26	15 53.72	1 4.25	10 52 50.64
5	10 55 30.23	30.04	+ 6 52 11.9	13.1	9.031	−55.65	− 1 16.95	15 53.96	1 4.21	10 56 47.19
6	10 59 6.85	6.61	6 29 53.0	54.5	9.021	55.92	1 36.88	15 54.21	1 4.18	11 0 43.74
7	11 2 43.24	42.95	6 7 27.8	29.7	9.012	56.17	1 57.04	15 54.46	1 4.15	11 4 40.30
8	11 6 19.42	19.08	5 44 56.7	58.9	9.003	56.42	2 17.41	15 54.71	1 4.13	11 8 36.85
9	11 9 55.40	55.01	5 22 19.9	22.4	8.996	56.65	2 37.97	15 54.96	1 4.11	11 12 33.41
10	11 13 31.21	30.77	+ 4 59 37.8	40.6	8.989	−56.86	− 2 58.70	15 55.22	1 4.09	11 16 29.96
11	11 17 6.87	6.37	4 36 50.7	53.9	8.983	57.06	3 19.58	15 55.47	1 4.07	11 20 26.51
12	11 20 42.41	41.85	4 13 58.9	62.5	8.978	57.25	3 40.59	15 55.73	1 4.05	11 24 23.07
13	11 24 17.84	17.24	3 51 2.7	6.6	8.974	57.43	4 1.72	15 55.99	1 4.04	11 28 19.62
14	11 27 53.19	52.54	3 28 2.4	6.6	8.972	57.59	4 22.93	15 56.25	1 4.03	11 32 16.18
15	11 31 28.48	27.78	+ 3 4 58.4	62.8	8.970	−57.74	− 4 44.19	15 56.51	1 4.02	11 36 12.73
16	11 35 3.73	2.97	2 41 50.8	55.6	8.968	57.88	5 5.48	15 56.76	1 4.01	11 40 9.28
17	11 38 38.96	38.15	2 18 40.1	45.2	8.968	58.01	5 26.79	15 57.02	1 4.01	11 44 5.84
18	11 42 14.20	13.34	1 55 26.5	32.0	8.969	58.12	5 48.10	15 57.28	1 4.01	11 48 2.39
19	11 45 49.47	48.55	1 32 10.4	16.3	8.971	58.22	6 9.39	15 57.54	1 4.02	11 51 58.94
20	11 49 24.78	23.81	+ 1 8 52.1	58.4	8.974	−58.30	− 6 30.62	15 57.80	1 4.03	11 55 55.50
21	11 52 60.17	59.15	0 45 31.9	38.6	8.977	58.37	6 51.77	15 58.06	1 4.04	11 59 52.05
22	11 56 35.65	34.58	+ 0 22 10.1	17.2	8.981	58.43	7 12.83	15 58.32	1 4.05	12 3 48.61
23	12 0 11.26	10.13	− 0 1 12.9	5.5	8.986	58.48	7 33.77	15 58.59	1 4.07	12 7 45.16
24	12 3 47.01	45.83	0 24 36.8	29.1	8.992	58.50	7 54.57	15 58.85	1 4.09	12 11 41.71
25	12 7 22.93	21.70	− 0 47 61.4	53.3	9.000	−58.52	− 8 15.21	15 59.12	1 4.11	12 15 38.27
26	12 10 59.02	57.74	1 11 26.2	17.7	9.008	58.53	8 35.67	15 59.39	1 4.14	12 19 34.82
27	12 14 35.31	33.98	1 34 50.8	42.0	9.016	58.52	8 55.93	15 59.66	1 4.17	12 23 31.37
28	12 18 11.82	10.43	1 58 14.9	5.8	9.026	58.49	9 15.98	15 59.93	1 4.20	12 27 27.93
29	12 21 48.55	47.11	2 21 38.0	28.7	9.036	58.44	9 35.80	16 0.20	1 4.23	12 31 24.48
30	12 25 25.53	24.04	− 2 44 59.9	50.3	9.046	−58.38	− 9 55.37	16 0.47	1 4.27	12 35 21.04
Oct. 1	12 29 2.78	1.24	− 3 8 20.2	10.2	9.058	−58.30	−10 14.67	16 0.75	1 4.31	12 39 17.59

Note.—For mean time interval of semidiameter passing meridian, subtract $0^{s}.18$ from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.		Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
		Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Decli-nation.				
		h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
Oct.	1	12 29 2.78	1.24	− 3 8 20.2	10.2	9.058	−58.30	−10 14.67	16 0.75	1 4.31	12 39 17.59
	2	12 32 40.31	38.72	3 31 38.3	28.0	9.070	58.20	10 33.69	16 1.03	1 4.35	12 43 14.14
	3	12 36 18.14	16.50	3 54 54.0	43.4	9.083	58.09	10 52.42	16 1.31	1 4.40	12 47 10.70
	4	12 39 56.28	54.59	4 17 66.8	56.0	9.096	57.97	11 10.84	16 1.59	1 4.45	12 51 7.25
	5	12 43 34.74	33.00	4 41 16.4	5.3	9.110	57.83	11 28.92	16 1.87	1 4.50	12 55 3.80
	6	12 47 13.56	11.77	− 5 4 22.4	11.0	9.125	−57.66	−11 46.65	16 2.16	1 4.55	12 59 0.36
	7	12 50 52.75	50.91	5 27 24.4	12.8	9.141	57.49	12 4.02	16 2.44	1 4.61	13 2 56.91
	8	12 54 32.33	30.44	5 50 22.1	10.4	9.158	57.31	12 21.00	16 2.73	1 4.67	13 6 53.47
	9	12 58 12.32	10.38	6 13 15.2	3.3	9.175	57.11	12 37.57	16 3.01	1 4.74	13 10 50.02
	10	13 1 52.74	50.76	6 35 63.3	51.1	9.194	56.89	12 53.70	16 3.29	1 4.81	13 14 46.57
	11	13 5 33.61	31.59	− 6 58 46.0	33.5	9.213	−56.66	−13 9.37	16 3.57	1 4.88	13 18 43.13
	12	13 9 14.96	12.89	7 21 23.0	10.3	9.233	56.41	13 24.58	16 3.85	1 4.96	13 22 39.68
	13	13 12 56.81	54.70	7 43 53.9	41.1	9.255	56.15	13 39.29	16 4.13	1 5.04	13 26 36.24
	14	13 16 39.18	37.03	8 6 18.4	5.5	9.277	55.88	13 53.49	16 4.41	1 5.12	13 30 32.79
	15	13 20 22.08	19.89	8 28 36.1	23.1	9.299	55.59	14 7.15	16 4.68	1 5.20	13 34 29.35
	16	13 24 5.53	3.30	− 8 50 46.7	33.5	9.323	−55.28	−14 20.24	16 4.95	1 5.28	13 38 25.90
	17	13 27 49.56	47.29	9 12 49.7	36.4	9.347	54.96	14 32.76	16 5.22	1 5.36	13 42 22.45
	18	13 31 34.19	31.89	9 34 44.9	31.5	9.373	54.63	14 44.68	16 5.49	1 5.45	13 46 19.01
	19	13 35 19.45	17.11	9 56 31.8	18.4	9.399	54.28	14 55.99	16 5.76	1 5.54	13 50 15.56
	20	13 39 5.35	2.97	10 17 70.2	56.7	9.426	53.91	15 6.66	16 6.03	1 5.63	13 54 12.12
	21	13 42 51.91	49.49	−10 39 39.6	26.0	9.454	−53.53	−15 16.67	16 6.29	1 5.72	13 58 8.67
	22	13 46 39.13	36.69	11 0 59.6	46.0	9.482	53.13	15 26.00	16 6.55	1 5.82	14 2 5.23
	23	13 50 27.05	24.58	11 21 69.8	56.3	9.511	52.72	15 34.64	16 6.81	1 5.92	14 6 1.78
	24	13 54 15.68	13.18	11 42 69.9	56.4	9.541	52.28	15 42.57	16 7.07	1 6.02	14 9 58.34
	25	13 58 5.03	2.50	12 3 59.5	45.9	9.572	51.83	15 49.78	16 7.33	1 6.12	14 13 54.89
	26	14 1 55.12	52.56	−12 24 38.1	24.4	9.603	−51.37	−15 56.27	16 7.58	1 6.22	14 17 51.45
	27	14 5 45.95	43.37	12 44 65.2	51.5	9.634	50.88	16 2.01	16 7.84	1 6.33	14 21 48.00
	28	14 9 37.53	34.93	13 5 20.4	6.8	9.665	50.38	16 6.99	16 8.10	1 6.44	14 25 44.56
	29	14 13 29.86	27.25	13 25 23.3	9.8	9.697	49.85	16 11.21	16 8.36	1 6.55	14 29 41.11
	30	14 17 22.97	20.34	13 45 13.5	0.1	9.729	49.31	16 14.66	16 8.61	1 6.66	14 33 37.67
	31	14 21 16.86	14.21	−14 4 50.6	37.4	9.761	−48.76	−16 17.34	16 8.87	1 6.77	14 37 34.22
Nov.	1	14 25 11.53	8.86	14 24 14.1	1.1	9.794	48.18	16 19.24	16 9.13	1 6.88	14 41 30.78
	2	14 29 6.98	4.30	14 43 23.6	10.7	9.827	47.59	16 20.35	16 9.38	1 6.99	14 45 27.34
	3	14 33 3.22	0.53	15 2 18.6	5.8	9.860	46.98	16 20.67	16 9.63	1 7.11	14 49 23.89
	4	14 36 60.26	57.57	15 20 58.8	46.1	9.893	46.35	16 20.20	16 9.88	1 7.23	14 53 20.45
	5	14 40 58.11	55.41	−15 39 23.7	11.2	9.927	−45.71	−16 18.92	16 10.12	1 7.35	14 57 17.00
	6	14 44 56.77	54.06	15 57 33.0	20.7	9.961	45.05	16 16.83	16 10.37	1 7.47	15 1 13.56
	7	14 48 56.24	53.53	16 15 26.2	14.2	9.995	44.37	16 13.92	16 10.61	1 7.59	15 5 10.12
	8	14 52 56.54	53.83	16 32 63.0	51.2	10.029	43.68	16 10.19	16 10.85	1 7.71	15 9 6.67
	9	14 56 57.67	54.96	16 50 23.0	11.4	10.064	42.98	16 5.62	16 11.09	1 7.83	15 13 3.23
	10	15 0 59.63	56.93	−17 7 25.8	14.5	10.099	−42.25	−16 0.23	16 11.32	1 7.95	15 16 59.79
	11	15 4 62.42	59.74	17 24 11.0	0.0	10.134	41.51	15 54.00	16 11.55	1 8.07	15 20 56.34
	12	15 9 6.05	3.38	17 40 38.2	27.5	10.169	40.75	15 46.93	16 11.78	1 8.19	15 24 52.90
	13	15 13 10.53	7.86	17 56 47.0	36.7	10.204	39.97	15 39.01	16 12.00	1 8.31	15 28 49.46
	14	15 17 15.86	13.20	18 12 37.1	27.1	10.239	39.19	15 30.25	16 12.22	1 8.43	15 32 46.01
	15	15 21 22.04	19.40	−18 27 68.1	58.4	10.274	−38.38	−15 20.64	16 12.43	1 8.55	15 36 42.57
	16	15 25 29.07	26.45	−18 43 19.7	10.3	10.310	−37.56	−15 10.18	16 12.64	1 8.67	15 40 39.13

Note.—For mean time interval of semidiameter passing meridian, subtract $0^{s}.18$ from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
Nov. 16	15 25 29.07	26.45	−18 43 19.7	10.3	10.310	−37.56	−15 10.18	16 12.64	1 8.67	15 40 39.13
17	15 29 36.95	34.35	18 58 11.5	2.4	10.346	36.73	14 58.86	16 12.84	1 8.79	15 44 35.68
18	15 33 45.67	43.11	19 12 43.1	34.3	10.381	35.89	14 46.70	16 13.04	1 8.90	15 48 32.24
19	15 37 55.24	52.71	19 26 54.0	45.5	10.416	35.02	14 33.69	16 13.24	1 9.01	15 52 28.80
20	15 42 5.66	3.16	19 40 43.8	35.7	10.451	34.14	14 19.84	16 13.43	1 9.12	15 56 25.36
21	15 46 16.91	14.45	−19 54 12.3	4.5	10.486	−33.24	−14 5.16	16 13.62	1 9.23	16 0 21.92
22	15 50 28.98	26.56	20 7 19.2	11.6	10.520	32.32	13 49.65	16 13.80	1 9.34	16 4 18.47
23	15 54 41.86	39.49	20 19 64.0	56.8	10.554	31.40	13 33.33	16 13.98	1 9.45	16 8 15.03
24	15 58 55.55	53.23	20 32 26.3	19.6	10.587	30.45	13 16.20	16 14.16	1 9.55	16 12 11.59
25	16 3 10.03	7.76	20 44 25.8	19.5	10.619	29.49	12 58.28	16 14.34	1 9.65	16 16 8.15
26	16 7 25.28	23.05	−20 55 62.1	56.1	10.651	−28.52	−12 39.60	16 14.51	1 9.76	16 20 4.70
27	16 11 41.27	39.08	21 7 14.8	9.1	10.682	27.53	12 20.17	16 14.68	1 9.86	16 24 1.26
28	16 15 57.99	55.84	21 17 63.5	58.2	10.711	26.53	12 0.01	16 14.85	1 9.96	16 27 57.82
29	16 20 15.41	13.32	21 28 28.1	23.2	10.740	25.51	11 39.14	16 15.01	1 10.06	16 31 54.38
30	16 24 33.51	31.49	21 38 28.2	23.7	10.768	24.49	11 17.60	16 15.17	1 10.15	16 35 50.94
Dec. 1	16 28 52.27	50.31	−21 47 63.5	59.3	10.795	−23.45	−10 55.40	16 15.33	1 10.24	16 39 47.50
2	16 33 11.66	9.76	21 57 13.6	9.7	10.821	22.39	10 32.57	16 15.49	1 10.33	16 43 44.05
3	16 37 31.66	29.82	22 5 58.3	54.6	10.846	21.33	10 9.12	16 15.64	1 10.41	16 47 40.61
4	16 41 52.24	50.47	22 14 17.4	14.0	10.869	20.26	9 45.09	16 15.79	1 10.49	16 51 37.17
5	16 46 13.38	11.68	22 22 10.6	7.5	10.892	19.17	9 20.51	16 15.93	1 10.56	16 55 33.73
6	16 50 35.05	33.43	−22 29 37.6	34.8	10.913	−18.07	− 8 55.39	16 16.07	1 10.63	16 59 30.29
7	16 54 57.23	55.69	22 36 38.2	35.7	10.934	16.97	8 29.76	16 16.21	1 10.70	17 3 26.85
8	16 59 19.90	18.44	22 43 12.3	10.1	10.954	15.86	8 3.65	16 16.34	1 10.77	17 7 23.41
9	17 3 43.02	41.65	22 49 19.6	17.7	10.972	14.74	7 37.08	16 16.47	1 10.84	17 11 19.96
10	17 8 6.57	5.28	22 54 59.9	58.3	10.990	13.62	7 10.08	16 16.58	1 10.90	17 15 16.52
11	17 12 30.53	29.31	−23 0 13.1	11.7	11.006	−12.49	− 6 42.68	16 16.69	1 10.96	17 19 13 08
12	17 16 54.87	53.72	23 4 59.0	57.9	11.021	11.34	6 14.90	16 16.80	1 11.01	17 23 9.64
13	17 21 19.55	18.48	23 9 17.5	16.6	11.035	10.19	5 46.77	16 16.90	1 11.05	17 27 6.20
14	17 25 44.55	43.57	23 13 8.4	7.7	11.048	9.04	5 18.32	16 17.00	1 11.09	17 31 2.76
15	17 30 9.85	8.96	23 16 31.6	31.0	11.059	7.88	4 49.57	16 17.09	1 11.13	17 34 59.32
16	17 34 35.42	34.62	−23 19 26.9	26.4	11.070	− 6.72	− 4 20.55	16 17.18	1 11.16	17 38 55.88
17	17 39 1.23	0.52	23 21 54.3	53.9	11.080	5.56	3 51.29	16 17.25	1 11.19	17 42 52.44
18	17 43 27.24	26.62	23 23 53.7	53.4	11.088	4.39	3 21.82	16 17.32	1 11.21	17 46 49.00
19	17 47 53.44	52.90	23 25 25.0	24.8	11.094	3.22	2 52.17	16 17.39	1 11.23	17 50 45.56
20	17 52 19.79	19.34	23 26 28.1	28.0	11.100	2.04	2 22.38	16 17.45	1 11.24	17 54 42.11
21	17 56 46.25	45.89	−23 27 2.9	2.9	11.104	− 0.86	− 1 52.48	16 17.51	1 11.25	17 58 38.67
22	18 1 12.79	12.52	23 27 9.4	9.4	11.106	+ 0.32	1 22.49	16 17.57	1 11.26	18 2 35.23
23	18 5 39.37	39.19	23 26 47.6	47.6	11.108	1.50	0 52.46	16 17.62	1 11.26	18 6 31.79
24	18 10 5.95	5.86	23 25 57.5	57.5	11.107	2.68	− 0 22.42	16 17.66	1 11.25	18 10 28.35
25	18 14 32.49	32.50	23 24 39.1	39.1	11.104	3.86	+ 0 7.58	16 17.70	1 11.24	18 14 24.91
26	18 18 58.96	59.07	−23 22 52.4	52.4	11.101	+ 5.04	+ 0 37.50	16 17.74	1 11.23	18 18 21.47
27	18 23 25.33	25.53	23 20 37.4	37.3	11.096	6.21	1 7.31	16 17.77	1 11.22	18 22 18.03
28	18 27 51.55	51.84	23 17 54.2	54.2	11.088	7.38	1 36.98	16 17.79	1 11.20	18 26 14.59
29	18 32 17.58	17.97	23 14 42.9	42.7	11.080	8.55	2 6.47	16 17.81	1 11.17	18 30 11.15
30	18 36 43.38	43.86	23 11 3.7	3.3	11.070	9.71	2 35.73	16 17.83	1 11.14	18 34 7.71
31	18 41 8.92	9.48	−23 6 56.6	56.1	11.059	+10.87	+ 3 4.72	16 17.85	1 11.10	18 38 4.27
32	18 45 34.17	34.81	−23 2 21.8	21.0	11.046	+12.02	+ 3 33.42	16 17.86	1 11.06	18 42 0.82

NOTE.—For mean time interval of semidiameter passing meridian, subtract $0^s.19$ from the sidereal interval.

MOON-CULMINATIONS, 1913.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Jan. 0	U	19 11.88	1.968	13 54 3.55	128.26	−13 51 30.8	−874.7	66.92	15 41.0	57 27.6	II. S.
1	L	7 35.72	2.005	14 19 55.61	130.50	16 40 12.7	810.8	67.49	15 35.9	57 8.8	II. S.
1	U	20 0.04	2.050	14 46 17.32	133.17	19 15 7.9	736.8	68.17	15 31.0	56 50.8	II. S.
2	L	8 24.93	2.098	15 13 12.90	136.09	21 34 17.1	653.1	68.91	15 26.2	56 33.4	II. S.
2	U	20 50.41	2.148	15 40 44.10	139.05	−23 35 45.7	−560.1	69.64	15 21.7	56 16.8	II. S.
3	L	9 16.46	2.193	16 8 49.70	141.80	25 17 45.9	458.5	70.31	15 17.4	56 1.1	II. S.
3	U	21 43.01	2.230	16 37 25.42	144.04	26 38 43.2	349.9	70.85	15 13.3	55 46.1	II. S.
4	L	10 9.94	2.255	17 6 23.76	145.54	27 37 22.2	235.9	71.19	15 9.4	55 31.9	II.N.
4	U	22 37.07	2.265	17 35 34.60	146.09	−28 12 52.7	−118.9	71.31	15 5.8	55 18.6	II.N.
5	L	11 4.21	2.256	18 4 45.96	145.60	28 24 55.0	− 1.6	71.17	15 2.4	55 5.9	
5	U	23 31.15	2.231	18 33 45.12	144.08	28 13 41.1	+113.2	70.76	14 59.2	54 54.1	
6	L	11 57.69	2.189	19 2 19.88	141.56	27 39 56.4	223.1	70.11	14 56.2	54 43.3	
7	U	0 23.65	2.135	19 30 19.77	138.29	−26 44 53.2	+326.0	69.27	14 53.5	54 33.4	
7	L	12 48.89	2.072	19 57 36.78	134.47	25 30 5.9	420.3	68.28	14 51.1	54 24.6	
8	U	1 13.34	2.003	20 24 5.83	130.34	23 57 24.3	505.0	67.20	14 49.0	54 17.0	I. N.
8	L	13 36.95	1.933	20 49 44.75	126.15	22 8 45.0	579.9	66.10	14 47.3	54 10.5	I. S.
9	U	1 59.74	1.866	21 14 34.07	122.12	−20 6 5.8	+645.0	65.02	14 45.9	54 5.5	I. S.
9	L	14 21.75	1.804	21 38 36.54	118.37	17 51 21.7	700.8	64.02	14 45.0	54 2.1	I. S.
10	U	2 43.05	1.749	22 1 56.67	115.06	15 26 21.2	747.9	63.13	14 44.5	54 0.5	I. S.
10	L	15 3.75	1.703	22 24 40.31	112.31	12 52 44.3	786.9	62.38	14 44.6	54 0.8	I. S.
11	U	3 23.96	1.667	22 46 54.28	110.14	−10 12 3.3	+818.7	61.80	14 45.3	54 3.1	I. S.
11	L	15 43.80	1.641	23 8 46.15	108.62	7 25 43.0	843.6	61.40	14 46.5	54 7.5	I. S.
12	U	4 3.40	1.628	23 30 23.95	107.80	4 35 1.5	862.2	61.20	14 48.3	54 14.3	I. S.
12	L	16 22.91	1.626	23 51 56.21	107.71	− 1 41 13.4	874.8	61.20	14 50.8	54 23.5	I. S.
13	U	4 42.48	1.637	0 13 31.87	108.38	+ 1 14 28.8	+881.2	61.42	14 54.1	54 35.4	I. S.
13	L	17 2.26	1.662	0 35 20.21	109.82	4 10 51.9	881.5	61.86	14 58.0	54 49.8	I. S.
14	U	5 22.42	1.700	0 57 30.92	112.12	7 6 37.8	875.0	62.53	15 2.6	55 6.7	I. S.
14	L	17 43.11	1.751	1 20 14.13	115.24	10 0 20.7	860.9	63.43	15 7.9	55 26.2	I. S.
15	U	6 4.51	1.818	1 43 40.23	119.26	+12 50 23.5	+838.0	64.56	15 13.9	55 48.1	I. S.
15	L	18 26.81	1.900	2 7 59.83	124.16	15 34 52.7	804.9	65.90	15 20.5	56 12.3	I. S.
16	U	6 50.16	1.995	2 33 23.33	129.90	18 11 35.2	759.9	67.44	15 27.6	56 38.6	I. S.
16	L	19 14.74	2.103	3 0 0.47	136.40	20 37 54.5	700.8	69.15	15 35.3	57 6.8	I. S.
17	U	7 40.68	2.221	3 27 59.40	143.50	+22 50 49.6	+625.4	70.96	15 43 3	57 36.2	I. S.
17	L	20 8.07	2.344	3 57 25.48	150.87	24 46 55.0	532.2	72.80	15 51.6	58 6.5	I. S.
18	U	8 36.93	2.464	4 28 19.80	158.11	26 22 26.9	419.8	74.57	15 59.9	58 36.9	I. S.
18	L	21 7.17	2.574	5 0 37.67	164.70	27 33 35.3	288.5	76.13	16 8.0	59 6.7	I. *N*.S.
19	U	9 38.61	2.662	5 34 7.51	170.00	+28 16 42.2	+140.0	77.36	16 15.8	59 35.5	I. N.
19	L	22 10.94	2.720	6 8 30.66	173.50	28 28 46.3	− 21.1	78.16	16 23.1	60 2.0	I. N.
20	U	10 43.75	2.742	6 43 22.83	174.81	28 7 47.8	188.9	78.44	16 29.5	60 25.5	I. N.
20	L	23 16.59	2.726	7 18 16.94	173.83	27 13 8.6	356.3	78.19	16 34.8	60 45.2	I. N.
21	U	11 49.02	2.675	7 52 46.75	170.82	+25 45 41.4	−515.4	77.46	16 39.0	61 0.5	I. N.
22	L	0 20.69	2.599	8 26 30.35	166.23	23 47 43.1	659.8	76.36	16 41.8	61 10.9	*I*.II.N.
22	U	12 51.34	2.507	8 59 12.40	160.69	21 22 40.3	785.5	75.03	16 43.2	61 15.9	II.N.*S*.
23	L	1 20.82	2.408	9 30 44.83	154.71	18 34 44.4	889.3	73.59	16 43.1	61 15.6	II.*N*.S.
23	U	13 49.13	2.311	10 1 6.11	148.88	+15 28 29.2	−969.4	72.14	16 41.5	61 9.8	II. S.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Jan. 23	U	13 49.13	2.311	10 1 6.11	148.88	+15 28 29.2	− 969.4	72.14	16 41.5	61 9.8	II. S.
24	L	2 16.32	2.222	10 30 20.01	143.55	12 8 30.7	1026.6	70.82	16 38.7	60 59.3	II. S.
24	U	14 42.51	2.145	10 58 34.00	138.93	8 39 14.7	1062.6	69.66	16 34.6	60 44.5	II. S.
25	L	3 7.86	2.083	11 25 57.75	135.20	5 4 47.3	1078.9	68.71	16 29.5	60 25.6	II. S.
25	U	15 32.56	2.036	11 52 42.21	132.38	+ 1 28 50.7	−1077.7	68.01	16 23.6	60 3.9	II. S.
26	L	3 56.80	2.006	12 18 58.67	130.53	− 2 5 15.8	1060.9	67.54	16 17.0	59 39.8	II. S.
26	U	16 20.76	1.990	12 44 58.31	129.57	5 34 34.9	1030.1	67.31	16 10.0	59 14.1	II. S.
27	L	4 44.61	1.988	13 10 51.74	129.48	8 56 28.5	986.8	67.31	16 2.8	58 47.6	II. S.
27	U	17 8.52	1.999	13 36 48.72	130.14	−12 8 34.2	− 932.3	67.51	15 55.5	58 20.7	II. S.
28	L	5 32.64	2.022	14 2 57.94	131.49	15 8 41.8	867.3	67.88	15 48.2	57 54.2	II. S.
28	U	17 57.08	2.053	14 29 26.61	133.37	17 54 50.7	792.6	68.38	15 41.1	57 28.2	II. S.
29	L	6 21.93	2.090	14 56 20.20	135.62	20 25 7.6	708.7	68.97	15 34.4	57 3.3	II. S.
29	U	18 47.26	2.130	15 23 41.95	138.03	−22 37 47.7	− 616.5	69.59	15 27.9	56 39.7	II. S.
30	L	7 13.06	2.170	15 51 32.69	140.41	24 31 13.9	516.6	70.19	15 21.9	56 17.7	II. S.
30	U	19 39.31	2.204	16 19 50.40	142.48	26 4 1.3	410.2	70.70	15 16.3	55 57.1	II. S.
31	L	8 5.93	2.230	16 48 30.18	144.04	27 14 59.1	298.7	71.06	15 11.2	55 38.2	II. S.
31	U	20 32.79	2.244	17 17 24.53	144.88	−28 3 16.6	− 183.9	71.24	15 6.5	55 21.2	II. S.
Feb. 1	L	8 59.73	2.244	17 46 23.80	144.86	28 28 26.8	− 67.8	71.19	15 2.4	55 6.1	II. N.
1	U	21 26.58	2.227	18 15 17.01	143.87	28 30 29.4	+ 47.0	70.91	14 58.7	54 52.6	II. N.
2	L	9 53.13	2.196	18 43 52.97	141.98	28 9 52.2	158.4	70.39	14 55.5	54 40.6	II. N.
2	U	22 19.23	2.151	19 12 1.33	139.29	−27 27 28.1	+ 264.4	69.66	14 52.6	54 30.0	II. N.
3	L	10 44.72	2.096	19 39 33.42	135.97	26 24 34.1	363.3	68.77	14 50.2	54 21.1	II. N.
3	U	23 9.51	2.035	20 6 22.95	132.23	25 2 43.7	453.6	67.75	14 48.1	54 13.5	
4	L	11 33.52	1.968	20 32 26.15	128.28	23 23 42.1	535.0	66.68	14 46.4	54 7.3	
4	U	23 56.75	1.903	20 57 41.82	124.35	−21 29 21.6	+ 606.8	65.60	14 45.1	54 2.5	
5	L	12 19.20	1.840	21 22 11.00	120.58	19 21 34.6	669.3	64.57	14 44.1	53 59.0	
6	U	0 40.93	1.782	21 45 56.65	117.11	17 2 11.9	722.9	63.61	14 43.5	53 56.8	
6	L	13 2.01	1.732	22 9 3.20	114.07	14 33 0.4	767.6	62.77	14 43.3	53 55.8	I. S.
7	U	1 22.54	1.690	22 31 36.22	111.53	−11 55 40.4	+ 804.3	62.06	14 43.4	53 56.4	I. S.
7	L	13 42.61	1.657	22 53 42.12	109.56	9 11 46.3	833.4	61.52	14 44.0	53 58.5	I. S.
8	U	2 2.35	1.635	23 15 27.93	108.19	6 22 47.3	855.2	61.15	14 45.0	54 2.1	I. S.
8	L	14 21.88	1.622	23 37 1.16	107.46	3 30 7.4	870.3	60.97	14 46.4	54 7.3	I. S.
9	U	2 41.33	1.621	23 58 29.67	107.39	− 0 35 7.5	+ 878.6	60.99	14 48.3	54 14.2	I. S.
9	L	15 0.84	1.632	0 20 1.67	108.05	+ 2 20 52.9	880.3	61.21	14 50.7	54 23.0	I. S.
10	U	3 20.54	1.655	0 41 45.73	109.44	5 16 34.1	875.4	61.64	14 53.6	54 33.8	I. S.
10	L	15 40.60	1.690	1 3 50.74	111.55	8 10 33.5	863.3	62.29	14 57.1	54 46.6	I. S.
11	U	4 1.16	1.739	1 26 25.86	114.45	+11 1 22.5	+ 843.5	63.16	15 1.2	55 1.5	I. S.
11	L	16 22.37	1.800	1 49 40.50	118.13	13 47 23.7	815.2	64.23	15 5.9	55 18.7	I. S.
12	U	4 44.40	1.874	2 13 44.19	122.62	16 26 48.1	777.1	65.49	15 11.2	55 38.2	I. S.
12	L	17 7.40	1.961	2 38 46.18	127.83	18 57 31.6	728.1	66.93	15 17.0	55 59.7	I. S.
13	U	5 31.51	2.059	3 4 55.02	133.72	+21 17 12.6	+ 666.5	68.52	15 23.4	56 23.3	I. S.
13	L	17 56.85	2.166	3 32 17.95	140.15	23 23 10.4	590.7	70.22	15 30.5	56 49.0	I. S.
14	U	6 23.51	2.277	4 0 59.77	146.83	25 12 25.8	499.2	71.93	15 37.9	57 16.4	I. S.
14	L	18 51.49	2.387	4 31 1.79	153.45	26 41 45.3	391.3	73.58	15 45.7	57 45.0	I. S.
15	U	7 20.75	2.488	5 2 20.59	159.53	+27 47 49.6	+ 266.8	75.07	15 53.8	58 14.6	I. S.

MOON-CULMINATIONS, 1913.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Feb. 15	U	7 20.75	2.488	5 2 20.59	159.53	+27 47 49.6	+ 266.8	75.07	15 53.8	58 14.6	I. S.
15	L	19 51.14	2.573	5 34 47.17	164.65	28 27 27.0	+ 127.1	76.29	16 2.0	58 44.6	I. N.*S*.
16	U	8 22.41	2.634	6 8 6.68	168.30	28 37 51.7	− 24.7	77.13	16 10.1	59 14.3	I. N.
16	L	20 54.23	2.664	6 41 59.44	170.16	28 17 3.4	184.2	77.53	16 17.9	59 43.0	I. N.
17	U	9 26.23	2.663	7 16 2.84	170.07	+27 24 4.5	− 345.4	77.47	16 25.2	60 9.9	I. N.
17	L	21 58.03	2.632	7 49 54.24	168.20	25 59 12.0	502.1	76.99	16 31.8	60 33.9	I. N.
18	U	10 29.30	2.576	8 23 13.84	164.84	24 3 56.9	648.1	76.16	16 37.4	60 54.5	I. N.
18	L	22 59.79	2.504	8 55 46.76	160.50	21 40 58.3	778.7	75.08	16 41.8	61 10.8	I. N.
19	U	11 29.36	2.423	9 27 24.03	155.66	+18 53 46.3	− 889.8	73.87	16 44.9	61 22.2	I. N.
19	L	23 57.95	2.342	9 58 2.53	150.76	15 46 27.0	979.6	72.65	16 46.5	61 28.0	I. N.
20	U	12 25.60	2.267	10 27 44.12	146.22	12 23 24.4	1047.1	71.50	16 46.6	61 28.4	II. N.*S*.
21	L	0 52.39	2.201	10 56 34.37	142.26	8 49 7.4	1092.0	70.49	16 45.1	61 23.2	II. *N*.S.
21	U	13 18.47	2.147	11 24 41.42	139.05	+ 5 7 59.3	−1115.7	69.67	16 42.2	61 12.5	II. S.
22	L	1 43.98	2.108	11 52 14.87	136.66	+ 1 24 10.4	1119.1	69.07	16 37.9	60 56.8	II. S.
22	U	14 9.11	2.083	12 19 24.95	135.16	− 2 18 25.6	1104.0	68.70	16 32.4	60 36.7	II. S.
23	L	2 34.02	2.071	12 46 21.90	134.50	5 56 14.9	1071.6	68.56	16 26.0	60 13.1	II. S.
23	U	14 58.88	2.073	13 13 15.58	134.61	− 9 26 3.2	−1023.9	68.62	16 18.8	59 46.6	II. S.
24	L	3 23.82	2.086	13 40 14.84	135.39	12 44 54.6	962.3	68.87	16 11.0	59 18.0	II. S.
24	U	15 48.99	2.109	14 7 27.32	136.77	15 50 11.6	888.4	69.26	16 2.9	58 48.2	II. S.
25	L	4 14.48	2.139	14 34 59.05	138.57	18 39 33.1	803.4	69.77	15 54.7	58 18.1	II. S.
25	U	16 40.35	2.173	15 2 53.91	140.59	−21 10 53.5	− 708.5	70.32	15 46.5	57 48.0	II. S.
26	L	5 6.64	2.207	15 31 13.45	142.64	23 22 23.9	605.3	70.86	15 38.5	57 18.7	II. S.
26	U	17 33.31	2.238	15 59 56.49	144.48	25 12 32.1	495.1	71.35	15 30.9	56 50.7	II. S.
27	L	6 0.31	2.261	16 28 59.08	145.86	26 40 5.5	379.7	71.70	15 23.7	56 24.3	II. S.
27	U	18 27.52	2.273	16 58 14.61	146.60	−27 44 13.4	− 261.2	71.88	15 17.0	56 0.0	II. S.
28	L	6 54.80	2.272	17 27 34.26	146.53	28 24 30.4	141.6	71.86	15 11.0	55 37.6	II. S.
28	U	19 21.98	2.256	17 56 47.84	145.57	28 40 56.6	− 23.2	71.60	15 5.6	55 17.6	II. N.
Mar. 1	L	7 48.88	2.225	18 25 44.68	143.75	28 33 59.5	+ 91.9	71.11	15 0.8	54 59.9	II. N.
1	U	20 15.34	2.182	18 54 14.75	141.14	−28 4 31.1	+ 201.8	70.40	14 56.6	54 44.6	II. N.
2	L	8 41.21	2.128	19 22 9.47	137.89	27 13 44.2	304.7	69.52	14 53.0	54 31.6	II. N.
2	U	21 6.39	2.067	19 49 22.35	134.20	26 3 8.8	399.8	68.51	14 50.1	54 20.8	II. N.
3	L	9 30.80	2.001	20 15 49.32	130.27	24 34 24.4	486.1	67.43	14 47.7	54 12.1	II. N.
3	U	21 54.42	1.935	20 41 28.77	126.31	−22 49 17.8	+ 563.4	66.32	14 45.9	54 5.4	II. N.
4	L	10 17.26	1.872	21 6 21.27	122.48	20 49 37.5	631.8	65.24	14 44.6	54 0.5	II. N.
4	U	22 39.36	1.813	21 30 29.27	118.91	18 37 10.8	691.3	64.22	14 43.7	53 57.5	II. N.
5	L	11 0.79	1.760	21 53 56.73	115.73	16 13 41.8	742.2	63.30	14 43.4	53 56.2	
5	U	23 21.63	1.715	22 16 48.75	113.01	−13 40 50.0	+ 785.1	62.52	14 43.5	53 56.5	
6	L	11 41.98	1.678	22 39 11.27	110.83	11 0 11.2	820.1	61.88	14 43.9	53 58.2	
7	U	0 1.94	1.651	23 1 10.82	109.19	8 13 16.9	847.7	61.40	14 44.7	54 1.2	
7	L	12 21.64	1.634	23 22 54.38	108.16	5 21 35.3	868.0	61.10	14 45.9	54 5.5	
8	U	0 41.20	1.627	23 44 29.26	107.76	− 2 26 32.3	+ 881.3	60.99	14 47.4	54 11.1	
8	L	13 0.74	1.631	0 6 3.03	107.98	+ 0 30 26.6	887.3	61.07	14 49.3	54 18.0	I. S.
9	U	1 20.39	1.646	0 27 43.50	108.88	3 27 55.5	886.2	61.35	14 51.6	54 26.2	I. S.
9	L	13 40.28	1.672	0 49 38.69	110.43	6 24 26.3	877.6	61.83	14 54.1	54 35.6	I. S.
10	U	2 0.56	1.709	1 11 56.82	112.70	+ 9 18 26.7	+ 861.0	62.50	14 57.1	54 46.4	I. S.

[Eph 13]

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Mar. 10	U	2 0.56	1.709	1 11 56.82	112.70	+ 9 18 26.7	+ 861.0	62.50	14 57.1	54 46.4	I. S.
10	L	14 21.35	1.758	1 34 46.22	115.65	12 8 18 2	836.1	63.37	15 0.4	54 58.7	I. S.
11	U	2 42.81	1.819	1 58 15.23	119.30	14 52 14.4	801.7	64.43	15 4.1	55 12.2	I. S.
11	L	15 5.05	1.890	2 22 32.01	123.61	17 28 19.1	757.2	65.65	15 8.2	55 27.3	I. S.
12	U	3 28.22	1.972	2 47 44.24	128.53	+19 54 24.2	+ 701.5	67.02	15 12.7	55 43.9	I. S.
12	L	15 52.42	2.062	3 13 58.55	133.95	22 8 8.6	633.7	68.50	15 17.7	56 2.1	I. S.
13	U	4 17.74	2.157	3 41 19.91	139.66	24 6 59.5	552.6	70.04	15 23.1	56 21.9	I. S.
13	L	16 44.21	2.254	4 9 50.88	145.47	25 48 13.1	457.4	71.56	15 28.9	56 43.1	I. S.
14	U	5 11.82	2.347	4 39 30.57	151.05	+27 9 0.0	+ 348.1	72.99	15 35.0	57 5.7	I. S.
14	L	17 40.50	2.430	5 10 14.06	156.03	28 6 33.9	225.4	74.25	15 41.5	57 29.6	I. S.
15	U	6 10.08	2.496	5 41 51.84	160.05	28 38 21.5	+ 90.8	75.24	15 48.3	57 54.5	I. *N*.S.
15	L	18 40.33	2.541	6 14 10.18	162.75	28 42 16.4	− 52.9	75.89	15 55.3	58 20.0	I. N.*S*.
16	U	7 10.97	2.561	6 46 52.06	163.96	+28 16 52.9	− 201.6	76.17	16 2.3	58 45.7	I. N.
16	L	19 41.70	2.555	7 19 39.00	163.59	27 21 35.4	351.0	76.06	16 9.2	59 11.2	I. N.
17	U	8 12.21	2.526	7 52 13.16	161.86	25 56 44.8	496.3	75.61	16 15.9	59 35.9	I. N.
17	L	20 42.26	2.479	8 24 19.41	159.01	24 3 38.5	632.9	74.88	16 22.2	59 58.8	I. N.
18	U	9 11.67	2.420	8 55 46.67	155.44	+21 44 23.6	− 757.1	73.96	16 27.8	60 19.6	I. N.
18	L	21 40.32	2.355	9 26 28.64	151.53	19 1 48.3	865.9	72.95	16 32.7	60 37.5	I. N.
19	U	10 8.18	2.290	9 56 23.62	147.66	15 59 12.0	957.0	71.95	16 36.6	60 51.8	I. N.
19	L	22 35.31	2.232	10 25 33.87	144.13	12 40 14.9	1029.2	71.02	16 39.4	61 1.9	I. N.
20	U	11 1.78	2.182	10 54 4.78	141.13	+ 9 8 49.6	−1081.6	70.24	16 40.9	61 7.3	I. N.
20	L	23 27.72	2.144	11 22 3.89	138.84	5 28 54.3	1114.2	69.63	16 41.0	61 7.7	I. N.
21	U	11 53.29	2.119	11 49 40.12	137.33	+ 1 44 28.3	1126.8	69.22	16 39.7	61 3.0	I. N.*S*.
22	L	0 18.63	2.107	12 17 3.06	136.62	− 2 0 33.2	1120.2	69.03	16 37.0	60 53.4	II.*N*.S.
22	U	12 43.91	2.108	12 44 22.31	136.70	− 5 42 21.5	−1094.9	69.06	16 33.1	60 39.0	II. S.
23	L	1 9.28	2.122	13 11 47.09	137.53	9 17 18.4	1051.9	69.30	16 28.1	60 20.4	II. S.
23	U	13 34.88	2.147	13 39 25.62	139.00	12 41 56.8	992.2	69.71	16 22.0	59 58.1	II. S.
24	L	2 0.83	2.179	14 7 24.81	140.95	15 53 4.6	916.9	70.23	16 15.1	59 32.7	II. S.
24	U	14 27.20	2.217	14 35 49.55	143.21	−18 47 46.1	− 827.8	70.85	16 7.6	59 5.1	II. S.
25	L	2 54.03	2.256	15 4 42.32	145.57	21 23 24.6	726.7	71.49	15 59.7	58 36.1	II. S.
25	U	15 21.32	2.292	15 34 2.79	147.78	23 37 45.4	615.3	72.09	15 51.6	58 6.5	II. S.
26	L	3 49.02	2.322	16 3 47.41	149.56	25 28 58.9	495.9	72.57	15 43.4	57 36.6	II. S.
26	U	16 17.01	2.340	16 33 49.59	150.66	−26 55 46.0	− 371.3	72.87	15 35.4	57 7.3	II. S.
27	L	4 45.14	2.344	17 4 0.00	150.90	27 57 18.9	244.1	72.96	15 27.8	56 39.4	II. S.
27	U	17 13.21	2.332	17 34 7.34	150.14	28 33 24.6	− 117.2	72.80	15 20.7	56 13.1	II. S.
28	L	5 41.03	2.303	18 3 59.54	148.39	28 44 23.2	+ 6.6	72.37	15 14.1	55 48.8	II.*N*.S.
28	U	18 8.41	2.258	18 33 24.86	145.69	−28 31 7.3	+ 124.9	71.68	15 8.0	55 26.7	II.N.
29	L	6 35.17	2.200	19 2 13.12	142.24	27 54 54.2	235.8	70.79	15 2.7	55 7.0	II.N.
29	U	19 1.18	2.134	19 30 16.47	138.24	26 57 21.4	338.1	69.74	14 58.0	54 50.0	II.N.
30	L	7 26.36	2.063	19 57 29.82	133.95	25 40 17.5	431.0	68.60	14 54.1	54 35.6	II.N.
30	U	19 50.68	1.990	20 23 50.90	129.57	−24 5 37.8	+ 514.1	67.40	14 50.9	54 23.9	II.N.
31	L	8 14.13	1.919	20 49 20.04	125.32	22 15 16.9	587.7	66.22	14 48.4	54 14.7	II.N.
31	U	20 36.75	1.853	21 13 59.62	121.35	20 11 6.8	652.4	65.10	14 46.6	54 8.1	II.N.
Apr. 1	L	8 58.63	1.794	21 37 53.88	117.78	17 54 53.4	708.5	64.07	14 45.5	54 3.9	II.N.
1	U	21 19.84	1.743	22 1 8.16	114.70	−15 28 16.7	+ 756.4	63.15	14 44.9	54 1.9	II.N.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit	Diff. for 1 Hour of Long.	Right Ascension of Center	Diff. for 1 Hour of Long	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Apr. 1	L	8 58.63	1 794	21 37 53.88	117.78	−17 54 53.4	+ 708.5	64.07	14 45.5	54 3.9	II.N.
1	U	21 19.84	1 743	22 1 8.16	114.70	15 28 16.7	756.4	63.15	14 44.9	54 1.9	II.N.
2	L	9 40.48	1 700	22 23 48.72	112.17	12 52 50.3	796.7	62.41	14 45.0	54 2.1	II.N.
2	U	22 0.68	1.668	22 46 2.44	110.23	10 10 2.9	829.9	61.81	14 45.6	54 4.2	II.N.
3	L	10 20.56	1.646	23 7 56.60	108.92	− 7 21 19.7	+ 856.0	61.40	14 46.6	54 8.2	II.N.
3	U	22 40 24	1.635	23 29 38.70	108.23	4 28 3.3	875.4	61 18	14 48.2	54 13.8	II.N.
4	L	10 59.85	1.635	23 51 16.47	108.20	− 1 31 36.7	887.8	61 14	14 50.1	54 20.8	II.N.
4	U	23 19.51	1.645	0 12 57.79	108.82	+ 1 26 35.8	893.2	61.31	14 52.4	54 29.2	
5	L	11 39.36	1.666	0 34 50.63	110.12	+ 4 25 6.6	+ 890.8	61.67	14 55.0	54 38.7	
5	U	23 59 54	1.699	0 57 3.12	112.10	7 22 22.7	880.5	62.23	14 57.9	54 49.4	
6	L	12 20.19	1.744	1 19 43.40	114.73	10 16 43.9	861.6	62.99	15 1.0	55 1.0	
7	U	0 41.43	1.799	1 42 59.51	118.05	13 6 21.5	833.1	63.94	15 4.4	55 13.3	
7	L	13 3.39	1.864	2 6 59.35	122.02	+15 49 16.5	+ 794.3	65.05	15 8.0	55 26.5	I. S.
8	U	1 26.20	1.940	2 31 50.16	126.55	18 23 18.6	744.2	66.31	15 11.8	55 40.4	I. S.
8	L	13 49.97	2 023	2 57 38.35	131.55	20 46 6.7	681.8	67.68	15 15.8	55 55.0	I. S.
9	U	2 14.77	2.111	3 24 28.66	136.87	22 55 8.6	606.3	69.11	15 19.9	56 10.2	I. S.
9	L	14 40.65	2.201	3 52 23.69	142.29	+24 47 44.4	+ 517.3	70.55	15 24.2	56 26.2	I. S.
10	U	3 7.59	2.288	4 21 22.96	147.52	26 21 10.7	414.8	71.93	15 28.7	56 42.6	I. S.
10	L	15 35.53	2.367	4 51 22.33	152.24	27 32 48.0	299.4	73.15	15 33.4	56 59.7	I. S.
11	U	4 4.33	2.431	5 22 13.55	156.11	28 20 10.9	172.7	74.14	15 38.2	57 17.4	I. S.
11	L	16 33.80	2.476	5 53 44.44	158.81	+28 41 18.4	+ 37.3	74.83	15 43.1	57 35.5	I. S.
12	U	5 3.67	2.498	6 25 39.68	160.15	28 34 45.4	− 103.4	75.19	15 48.2	57 54.1	I. N.
12	L	17 33.66	2.497	6 57 42.37	160.05	27 59 50.7	245.6	75.18	15 53.3	58 12.9	I. N.
13	U	6 3.49	2.473	7 29 35.71	158.63	26 56 41.1	385.1	74.84	15 58.5	58 31.7	I. N.
13	L	18 32.93	2.431	8 1 5.11	156.10	+25 26 12.5	− 518.2	74.22	16 3.6	58 50.4	I. N.
14	U	7 1.78	2.376	8 31 59.31	152.82	23 30 1.4	641.7	73.39	16 8.4	59 8.3	I. N.
14	L	19 29.94	2.315	9 2 11.41	149.15	21 10 19.3	753.0	72.45	16 13.1	59 25.4	I. N.
15	U	7 57.35	2.253	9 31 38.75	145.43	18 29 43.3	850.4	71.48	16 17.4	59 41.1	I. N.
15	L	20 24.03	2.195	10 0 22.57	141.94	+15 31 8.0	− 932.9	70.56	16 21.2	59 55.0	I. N.
16	U	8 50.07	2.146	10 28 27.26	138.94	12 17 39.3	999.2	69.75	16 24.3	60 6.6	I. N.
16	L	21 15.57	2.107	10 55 59.61	136.58	8 52 31.3	1049.3	69.10	16 26.7	60 15.3	I. N.
17	U	9 40.67	2.080	11 23 8.04	134.97	5 19 2.6	1082.6	68.65	16 28.2	60 21.0	I. N.
17	L	22 5.53	2.066	11 50 1.97	134.16	+ 1 40 36.0	−1098.9	68.41	16 28.8	60 23.2	I. N.
18	U	10 30.31	2.066	12 16 51.27	134.19	− 1 59 22.7	1097.6	68.39	16 28.4	60 21.6	I. N.
18	L	22 55.18	2.080	12 43 45.80	135.02	5 37 25.8	1079.6	68.59	16 26.9	60 16.1	I. N.
19	U	11 20.29	2.107	13 10 54.96	136.62	9 10 5.3	1044.0	68.99	16 24.3	60 6.7	I. N.S.
19	L	23 45.79	2.144	13 38 27.25	138.86	−12 33 53.6	− 991.2	69.57	16 20.7	59 53.5	I. N.S.
20	U	12 11.78	2.190	14 6 29.63	141.60	15 45 27.4	921.7	70.28	16 16.2	59 36.9	II. S.
21	L	0 38.36	2.242	14 35 6.98	144.66	18 41 31.3	836.4	71.07	16 10.8	59 17.1	II. S.
21	U	13 5.56	2.292	15 4 21.53	147.76	21 19 3.1	736.6	71.87	16 4.7	58 54.8	II. S.
22	L	1 33.36	2.339	15 34 12.10	150.60	−23 35 19.1	− 624.1	72.61	15 58.1	58 30.5	II. S.
22	U	14 1.67	2.377	16 4 33.82	152.89	25 28 2.1	501.6	73.21	15 51.1	58 4.8	II. S.
23	L	2 30.36	2.401	16 35 18.12	154.31	26 55 28.8	372.0	73.60	15 43.9	57 38.4	II. S.
23	U	14 59.23	2.407	17 6 13.23	154.66	27 56 35.3	238.8	73.73	15 36.7	57 11.9	II. S.
24	L	3 28.04	2.392	17 37 5.09	153.75	−28 31 1.4	− 105.9	73.54	15 29.6	56 45.8	II. S.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Apr. 24	L	3 28.04	2.392	17 37 5.09	153.75	−28 31 1.4	− 105.9	73.54	15 29.6	56 45.8	II. S.
24	U	15 56.56	2.357	18 7 39.01	151.68	28 39 10.2	+ 23.4	73.05	15 22.7	56 20.6	II.*N*.S.
25	L	4 24.54	2.305	18 37 41.08	148.50	28 22 4.5	146.2	72.29	15 16.3	55 57.0	II.N.*S*.
25	U	16 51.80	2.238	19 6 59.63	144.47	27 41 18.2	259.9	71.29	15 10.3	55 35.1	II.N.
26	L	5 18.20	2.161	19 35 26.09	139.87	−26 38 47.8	+ 363.4	70.13	15 5.0	55 15.4	II.N.
26	U	17 43.65	2.080	20 2 55.45	135.00	25 16 41.9	455.8	68.86	15 0.2	54 58.1	II.N.
27	L	6 8.12	1.999	20 29 26.04	130.12	23 37 12.1	537.4	67.57	14 56.2	54 43.3	II.N.
27	U	18 31.64	1.921	20 54 59.17	125.46	21 42 27.0	608.4	66.30	14 52.9	54 31.3	II.N.
28	L	6 54.26	1.850	21 19 38.48	121.18	−19 34 27.6	+ 669.9	65.12	14 50.4	54 21.9	II.N.
28	U	19 16.08	1.787	21 43 29.34	117.39	17 15 5.2	722.4	64.06	14 48.6	54 15.3	II.N.
29	L	7 37.20	1.734	22 6 38.34	114.21	14 46 1.4	766.9	63.13	14 47.5	54 11.3	II.N.
29	U	19 57.75	1.692	22 29 12.89	111.66	12 8 48.0	804.0	62.38	14 47.2	54 10.2	II.N.
30	L	8 17.85	1.661	22 51 20.83	109.77	− 9 24 49.8	+ 834.4	61.80	14 47.5	54 11.5	II.N.
30	U	20 37.65	1.641	23 13 10.35	108.59	6 35 26.6	858.3	61.43	14 48.6	54 15.2	II.N.
May 1	L	8 57.28	1.633	23 34 49.79	108.11	3 41 54.8	875.9	61.26	14 50.2	54 21.1	II.N.
1	U	21 16.89	1.637	23 56 27.64	108.33	− 0 45 30.7	887.1	61.28	14 52.3	54 29.0	II.N.
2	L	9 36.61	1.652	0 18 12.44	109.27	+ 2 12 26.5	+ 891.4	61.52	14 55.0	54 38.9	II.N.
2	U	21 56.59	1.680	0 40 12.88	110.93	5 10 33.1	888.5	61.97	14 58.1	54 50.3	II.N.
3	L	10 16.98	1.720	1 2 37.69	113.34	8 7 17.9	877.6	62.63	15 1.6	55 3.1	II.N.
3	U	22 37.92	1.772	1 25 35.56	116.45	11 0 59.4	857.7	63.48	15 5.4	55 17.1	II.N.
4	L	10 59.54	1.835	1 49 15.02	120.26	+13 49 43.8	+ 827.9	64.53	15 9.5	55 32.0	
4	U	23 22.00	1.909	2 13 44.21	124.72	16 31 24.3	786.9	65.74	15 13.7	55 47.5	
5	L	11 45.40	1.993	2 39 10.48	129.75	19 3 38.5	733.3	67.09	15 18.1	56 3.6	
6	U	0 9.85	2.083	3 5 39.80	135.20	21 23 49.9	666.2	68.53	15 22.5	56 19.8	
6	L	12 35.41	2.177	3 33 15.99	140.85	+23 29 10.3	+ 584.7	70.01	15 27.0	56 36.1	
7	U	1 2.10	2.270	4 1 59.95	146.43	25 16 44.0	488.4	71.45	15 31.3	56 52.1	I. S.
7	L	13 29.87	2.356	4 31 48.79	151.59	26 43 35.3	377.7	72.77	15 35.6	57 8.0	I. S.
8	U	1 58.59	2.428	5 2 35.11	155.95	27 46 59.5	254.3	73.88	15 39.8	57 23.2	I. S.
8	L	14 28.07	2.481	5 34 7.08	159.14	+28 24 35.7	+ 120.4	74.70	15 43.8	57 38.1	I. S.
9	U	2 58.05	2.510	6 6 8.91	160.89	28 34 40.5	− 20.3	75.16	15 47.7	57 52.3	I. S.
9	L	15 28.22	2.513	6 38 22.36	161.07	28 16 17.6	163.5	75.25	15 51.5	58 6.0	I. S.
10	U	3 58.27	2.491	7 10 28.75	159.73	27 29 23.9	304.7	74.95	15 54.9	58 18.8	I. N.
10	L	16 27.92	2.448	7.42 11.11	157.12	+26 14 49.8	− 439.6	74.33	15 58.2	58 30.9	I. N.
11	U	4 56.95	2.389	8 13 15.93	153.55	24 34 12.3	564.7	73.48	16 1.4	58 42.4	I. N.
11	L	17 25.21	2.320	8 43 34.25	149.43	22 29 44.1	677.7	72.47	16 4.3	58 53.0	I. N.
12	U	5 52.62	2.249	9 13 1.83	145.15	20 4 2.1	776.9	71.39	16 6.9	59 2.7	I. N.
12	L	18 19.20	2.181	9 41 38.81	141.06	+17 19 58.1	− 861.4	70.34	16 9.2	59 11.2	I. N.
13	U	6 44.99	2.120	10 9 29.01	137.40	14 20 28.9	931.0	69.38	16 11.2	59 18.6	I. N.
13	L	19 10.11	2.069	10 36 38.89	134.36	11 8 33.1	985.8	68.57	16 12.9	59 24.8	I. N.
14	U	7 34.71	2.032	11 3 16.88	132.10	7 47 8.0	1026.0	67.96	16 14.2	59 29.4	I. N.
14	L	19 58.93	2.008	11 29 32.64	130.66	+ 4 19 8.7	−1051.5	67.56	16 15.0	59 32.4	I. N.
15	U	8 22.96	1.999	11 55 36.41	130.12	+ 0 47 29.1	1062.6	67.38	16 15.3	59 33.4	I. N.
15	L	20 46.96	2.004	12 21 38.82	130.43	− 2 44 55.5	1059.0	67.43	16 15.0	59 32.4	I. N.
16	U	9 11.12	2.024	12 47 50.25	131.60	− 6 15 7.7	1040.3	67.72	16 14.1	59 29.0	I. N.
16	L	21 35.58	2.056	13 14 20.66	133.58	− 9 40 7.1	−1006.8	68.21	16 12.5	59 23.2	I. N.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
May 16	L	21 35.58	2.056	13 14 20.66	133.58	− 9 40 7.1	−1006.8	68.21	16 12.5	59 23.2	I. N.
17	U	10 0.52	2.101	13 41 19.04	136.26	12 56 49.7	957.6	68.88	16 10.2	59 14.8	I. N.
17	L	22 26.04	2.154	14 8 52.96	139.49	16 2 9.0	892.9	69.70	16 7.3	59 4.1	I. N.
18	U	10 52.25	2.214	14 37 7.97	143.07	18 52 58.2	812.7	70.60	16 3.7	58 50.9	I. N.*S*.
18	L	23 19.18	2.275	15 6 6.78	146.74	−21 26 15.3	− 717.7	71.52	15 59.5	58 35.5	I. *N*.S.
19	U	11 46.83	2.332	15 35 48.67	150.18	23 39 9.8	609.2	72.38	15 54.7	58 18.0	I. S.
20	L	0 15.12	2.380	16 6 8.93	153.07	25 29 11.4	489.2	73.11	15 49.5	57 58.8	II. S.
20	U	12 43.90	2.413	16 36 58.66	155.04	26 54 18.8	360.8	73.61	15 43.9	57 38.4	II. S.
21	L	1 12.96	2.426	17 8 5.20	155.83	−27 53 10.3	− 227.3	73.82	15 38.1	57 16.9	II. S.
21	U	13 42.04	2.417	17 39 13.21	155.27	28 25 9.8	− 92.7	73.70	15 32.1	56 55.0	II. S.
22	L	2 10.88	2.385	18 10 6.27	153.35	28 30 29.1	+ 38.7	73.26	15 26.2	56 33.2	II. S.
22	U	14 39.20	2.332	18 40 28.60	150.18	28 10 6.1	163.7	72.50	15 20.3	56 11.7	II.*N*.S.
23	L	3 6.79	2.263	19 10 6.82	146.04	−27 25 36.4	+ 279.5	71.49	15 14.7	55 51.3	II.N.*S*.
23	U	15 33.48	2.183	19 38 51.05	141.23	26 19 2.8	384.2	70.30	15 9.5	55 32.0	II N.
24	L	3 59.18	2.098	20 6 35.29	136.10	24 52 44.1	477.0	69.00	15 4.7	55 14.3	II.N.
24	U	16 23.84	2.012	20 33 17.43	130.93	23 9 3.7	557.8	67.66	15 0.4	54 58.7	II.N.
25	L	4 47.49	1.930	20 58 58.67	125.99	−21 10 22.0	+ 627.2	66.35	14 56.7	54 45.1	II.N.
25	U	17 10.20	1.855	21 23 42.81	121.45	18 58 50.0	686.3	65.13	14 53.7	54 34.0	II.N.
26	L	5 32.05	1.788	21 47 35.61	117.45	16 36 27.4	735.9	64.03	14 51.3	54 25.3	II.N.
26	U	17 53.16	1.732	22 10 44.19	114.10	14 5 1.9	777.0	63.09	14 49.7	54 19.4	II.N.
27	L	6 13.67	1.688	22 33 16.42	111.41	−11 26 8.9	+ 810.6	62.32	14 48.8	54 16.0	II.N.
27	U	18 33.72	1.655	22 55 20.74	109.45	8 41 13.9	837.5	61.75	14 48.6	54 15.5	II.N.
28	L	6 53.44	1.634	23 17 5.89	108.23	5 51 35.3	858.0	61.38	14 49.2	54 17.7	II.N.
28	U	19 13.00	1.627	23 38 40.81	107.74	2 58 26.2	872.5	61.23	14 50.6	54 22.6	II.N.
29	L	7 32.54	1.632	0 0 14.55	108.02	− 0 2 58.5	+ 881.1	61.29	14 52.6	54 30.0	II.N.
29	U	19 52.21	1.649	0 21 56.28	109.07	+ 2 53 34.8	883.4	61.57	14 55.3	54 39.9	II.N.
30	L	8 12.16	1.680	0 43 55.32	110.92	5 49 56.5	879.0	62.07	14 58.6	54 52.0	II.N.
30	U	20 32.57	1.723	1 6 21.09	113.53	8 44 41.1	867.1	62.79	15 2.5	55 6.3	II.N.
31	L	8 53.57	1.780	1 29 23.07	116.94	+11 36 12.7	+ 846.6	63.72	15 6.8	55 22.3	II.N.
31	U	21 15.33	1.849	1 53 10.57	121.11	14 22 41.0	816.2	64.85	15 11.6	55 39.9	II.N.
June 1	L	9 38.00	1.930	2 17 52.57	126.01	17 1 59.5	774.7	66.16	15 16.8	55 58.7	II.N.
1	U	22 1.70	2.022	2 43 37.14	131.52	19 31 43.2	720.2	67.61	15 22.1	56 18.3	II.N.
2	L	10 26.56	2.122	3 10 30.88	137.50	+21 49 8.6	+ 651.4	69.16	15 27.6	56 38.6	II.N..
2	U	22 52.64	2.225	3 38 37.96	143.70	23 51 16.2	567.1	70.74	15 33.2	56 58.9	II. S.
3	L	11 19.94	2.326	4 7 59.06	149.77	25 34 55.1	466.6	72.26	15 38.6	57 18.9	
3	U	23 48.42	2.418	4 38 30.45	155.32	26 56 53.2	350.5	73.64	15 43.9	57 38.2	
4	L	12 17.91	2.494	5 10 3.07	159.91	+27 54 10.6	+ 220.4	74.76	15 48.9	57 56.6	
5	U	0 48.18	2.547	5 42 22.64	163.08	28 24 16.0	+ 79.1	75.54	15 53.5	58 13.5	
5	L	13 18.92	2.572	6 15 10.45	164.57	28 25 23.3	− 68.6	75.92	15 57.7	58 28.9	I. S.
6	U	1 49.78	2.566	6 48 5.24	164.25	27 56 44.7	217.6	75.86	16 1.4	58 42.5	I. S.
6	L	14 20.40	2.533	7 20 45.84	162.25	+26 58 37.3	− 362.6	75.40	16 4.5	58 54.1	I. N.
7	U	2 50.48	2.477	7 52 53.60	158.85	25 32 20.1	498.5	74.61	16 7.1	59 3.6	I. N.
7	L	15 19.77	2.404	8 24 14.45	154.50	23 40 3.5	621.9	73.57	16 9.2	59 11.1	I. N.
8	U	3 48.14	2.324	8 54 39.70	149.66	21 24 36.1	730.0	72.40	16 10.7	59 16.5	I. N.
8	L	16 15.54	2.242	9 24 6.13	144.78	+18 49 8.4	− 821.8	71.19	16 11.7	59 20.2	I. N.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
June 8	L	16 15.54	2.242	9 24 6.13	144.78	+18 49 8.4	− 821 8	71.19	16 11.7	59 20.2	I. N.
9	U	4 41.98	2.166	9 52 35.24	140.16	15 56 58.9	897.0	70.03	16 12.2	59 22.0	I. N.
9	L	17 7.55	2.098	10 20 12.19	136.11	12 51 25.8	955.8	68.99	16 12.2	59 22.0	I. N.
10	U	5 32.39	2.043	10 47 4.75	132.78	9 35 41.0	999.0	68.13	16 11.8	59 20.6	I. N.
10	L	17 56.65	2.002	11 13 22.41	130.30	+ 6 12 47.0	−1027.5	67.47	16 11.0	59 17.8	I. N.
11	U	6 20.50	1.976	11 39 15.70	128.72	+ 2 45 37.3	1041.8	67.05	16 9.9	59 13.7	I. N.
11	L	18 44.13	1.965	12 4 55.53	128.06	− 0 43 2.3	1042.4	66.86	16 8.4	59 8.3	I. N.
12	U	7 7.71	1.969	12 30 32.93	128.31	4 10 30.1	1029.8	66.91	16 6.6	59 1.7	I. N.
12	L	19 31.44	1.988	12 56 18.65	129.45	− 7 34 7.8	−1004.1	67.20	16 4.6	58 54.1	I. N.
13	U	7 55.47	2.020	13 22 22.87	131.38	10 51 16.8	965.1	67.69	16 2.1	58 45.2	I. N.
13	L	20 19.97	2.064	13 48 54.74	134.94	13 59 16.9	912.6	68.37	15 59.4	58 35.2	I. N.
14	U	8 45.05	2.118	14 16 2.16	137.27	16 55 25.0	846 5	69.19	15 56.4	58 24.1	I. N.
14	L	21 10.82	2.178	14 43 50.81	140.88	−19 36 57.3	− 766.6	70.09	15 53.0	58 11.8	I. N.
15	U	9 37.32	2.240	15 12 23.83	144.62	22 1 11.5	673.5	71.01	15 49.4	57 58.6	I. N.
15	L	22 4.56	2.299	15 41 40.95	148.17	24 5 32.0	568.0	71.89	15 45.5	57 44.3	I. N.*S*.
16	U	10 32.47	2.350	16 11 37.98	151.21	25 47 38.8	451.5	72.63	15 41.4	57 29.0	I. *N*.S.
16	L	23 0.90	2.386	16 42 6.65	153.38	−27 5 34.9	− 326.7	73.16	15 37.0	57 12.9	I. S.
17	U	11 29.65	2.403	17 12 54.82	154.42	27 57 57.8	196.6	73.40	15 32.4	56 56.1	I. S.
17	L	23 58.48	2.398	17 43 47.55	154.12	28 24 6.2	− 64 9	73.32	15 27.7	56 38.9	I.*II*. S.
18	U	12 27.11	2.370	18 14 28.55	152.47	28 24 5.0	+ 64.4	72.92	15 23.0	56 21.5	II. S.
19	L	0 55.28	2.322	18 44 41.95	149.57	−27 58 43.8	+ 187.9	72.20	15 18.2	56 4.1	II. S.
19	U	13 22.77	2.257	19 14 13.98	145.62	27 9 31.4	302.6	71.22	15 13.6	55 47.1	II.*N*.S.
20	L	1 49.40	2.180	19 42 54.22	140.99	25 58 26.2	406.3	70.06	15 9.1	55 30.7	II.*N*.S.
20	U	14 15.06	2.096	20 10 36.10	135.95	24 27 45.8	498.4	68.78	15 4.9	55 15.2	II.N.
21	L	2 39.69	2.011	20 37 16.68	130.84	−22 39 54.8	+ 578 2	67.46	15 1.0	55 0.9	II.N.
21	U	15 3.33	1.929	21 2 56.84	125.90	20 37 17.1	646.1	66.16	14 57.5	54 48.1	II.N.
22	L	3 26.01	1.853	21 27 39.84	121.35	18 22 9.3	703.2	64.95	14 54.5	54 37.0	II.N.
22	U	15 47.83	1.786	21 51 31.10	117.30	15 56 36.7	750.4	63.86	14 52.0	54 27.9	II.N.
23	L	4 8.91	1.729	22 14 37.45	113.87	−13 22 33.0	+ 788.7	62.92	14 50.1	54 20.8	II.N.
23	U	16 29.37	1.682	22 37 6.64	111.12	10 41 38.8	819.1	62.16	14 48.8	54 16.0	II.N.
24	L	4 49.35	1.648	22 59 7.03	109.08	7 55 24.0	842.2	61.60	14 48.2	54 13.9	II.N.
24	U	17 9.00	1.627	23 20 47.30	107.77	5 5 9.8	859.0	61.23	14 48.3	54 14.3	II.N.
25	L	5 28.46	1.618	23 42 16.40	107.20	− 2 12 10.2	+ 869.9	61.09	14 49.2	54 17.4	II.N.
25	U	17 47.88	1.622	0 3 43.44	107.43	+ 0 42 23.2	874.8	61.16	14 50.7	54 23.0	II.N.
26	L	6 7.43	1.639	0 25 17.74	108.44	3 37 19.7	873.7	61.45	14 53.0	54 31.3	II.N.
26	U	18 27.25	1.669	0 47 8.77	110.22	6 31 26.5	866.3	61.96	14 56.0	54 42.4	II.N.
27	L	6 47.52	1.712	1 9 26.19	112.83	+ 9 23 24.1	+ 852.0	62.70	14 59.7	54 56.0	II.N.
27	U	19 8.38	1.768	1 32 19.79	116.26	12 11 43.1	829.7	63.66	15 4.1	55 12.1	II.N.
28	L	7 30.01	1.839	1 55 59.35	120.49	14 54 41.4	798.3	64.82	15 9.1	55 30.4	II.N.
28	U	19 52.56	1.922	2 20 34.45	125.48	17 30 20.5	756.2	66.16	15 14.6	55 50.7	II.N.
29	L	8 16.18	2.017	2 46 13.87	131.17	+19 56 22.4	+ 701.8	67.67	15 20.6	56 12.8	II.N.
29	U	20 41.00	2.120	3 13 5.13	137.43	22 10 9.1	633.4	69.28	15 27.0	56 36.3	II.N.
30	L	9 7.09	2.229	3 41 13.39	143.98	24 8 42.9	549.5	70.93	15 33.6	57 0.6	II.N.
30	U	21 34.50	2.338	4 10 40.44	150.49	25 48 50.7	448.9	72.55	15 40.3	57 25.2	II.N.
July 1	L	10 3.16	2.438	4 41 23.40	156.54	+27 7 12.6	+ 332.0	74.03	15 47.1	57 50.2	II. S.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
July 1	L	10 3.16	2.438	4 41 23.40	156.54	+27 7 12.6	+ 332.0	74.03	15 47.1	57 50.2	II. S.
1	U	22 32.95	2.523	5 13 13.86	161.66	28 0 36.4	199.6	75.25	15 53.7	58 14.3	II. S.
2	L	11 3.62	2.585	5 45 57.45	165.35	28 26 14.9	+ 55.0	76.12	15 59.9	58 37.2	II. S.
2	U	23 34.86	2.616	6 19 15.12	167.25	28 22 5.2	− 97.3	76.56	16 5.7	58 58.3	
3	L	12 6.29	2.616	6 52 44.00	167.23	+27 47 6.7	− 252.1	76.55	16 10.8	59 17.0	
4	U	0 37.52	2.585	7 26 1.27	165.36	26 41 29.6	402.8	76.11	16 15.2	59 33.0	
4	L	13 8.22	2.528	7 58 46.46	161.95	25 6 34.9	544.2	75.30	16 18.7	59 46.1	I. S.
5	U	1 38.12	2.454	8 30 43.82	157.44	23 4 45.7	671.4	74.22	16 21.3	59 55.7	I. N.
5	L	14 7.06	2.370	9 1 43.47	152.42	+20 39 9.9	− 781.6	73.00	16 23.0	60 1.9	I. N.
6	U	2 34.98	2.285	9 31 41.46	147.26	17 53 23.9	873.0	71.74	16 23.8	60 4.6	I. N.
6	L	15 1.89	2.204	10 0 38.99	142.39	14 51 15.5	945.2	70.53	16 23.6	60 4.0	I. N.
7	U	3 27.89	2.132	10 28 41.26	138.10	11 36 31.5	999.0	69.45	16 22.7	60 0.5	I. N.
7	L	15 53.10	2.072	10 55 56.18	134.53	+ 8 12 50.1	−1035.0	68.54	16 20.9	59 54.1	I. N.
8	U	4 17.68	2.028	11 22 33.54	131.84	4 43 37.1	1054.5	67.85	16 18.5	59 45.3	I. N.
8	L	16 41.82	1.998	11 48 44.06	130.07	+ 1 12 3.1	1058.6	67.40	16 15.6	59 34.5	I. N.
9	U	5 5.70	1.984	12 14 38.82	129.21	− 2 18 53.7	1048.4	67.19	16 12.1	59 21.9	I. N.
9	L	17 29.49	1.985	12 40 28.88	129.27	− 5 46 26.2	−1024.7	67.21	16 8.3	59 8.0	I. N.
10	U	5 53.39	2.000	13 6 24.90	130.20	9 7 56.7	988.1	67.47	16 4.3	58 53.2	I. N.
10	L	18 17.55	2.029	13 32 36.84	131.92	12 20 52.2	939.0	67.93	16 0.1	58 37.6	I. N.
11	U	6 42.12	2.069	13 59 13.53	134.31	15 22 44.0	877.5	68.55	15 55.7	58 21.6	I. N.
11	L	19 7.23	2.117	14 26 22.26	137.23	−18 11 5.3	− 803.9	69.30	15 51.3	58 5.3	I. N.
12	U	7 32.96	2.171	14 54 8.29	140.49	20 43 31.8	718.5	70.12	15 46.8	57 48.9	I. N.
12	L	19 59.34	2.227	15 22 34.21	143.82	22 57 43.9	621.6	70.95	15 42.3	57 32.4	I. N.
13	U	8 26.38	2.279	15 51 39.36	146.97	24 51 29.9	514.4	71.72	15 37.8	57 16.0	I. N.
13	L	20 54.00	2.323	16 21 19.42	149.59	−26 22 53.2	− 398.2	72.35	15 33.4	56 59.8	I. N.
14	U	9 22.07	2.353	16 51 26.37	151.40	27 30 19.7	275.3	72.77	15 29.1	56 43.9	I. *N*.S.
14	L	21 50.40	2.365	17 21 48.77	152.13	28 12 44.7	148.6	72.92	15 24.8	56 28.1	I. S.
15	U	10 18.75	2.357	17 52 12.83	151.66	28 29 40.3	− 21.0	72.77	15 20.6	56 12.7	I. S.
15	L	22 46.88	2.328	18 22 23.67	149.94	−28 21 18.8	+ 103.8	72.32	15 16.5	55 57.6	I. S.
16	U	11 14.55	2.281	18 52 6.93	147.10	27 48 32.1	222.8	71.59	15 12.5	55 42.9	I. S.
16	L	23 41.56	2.218	19 21 10.23	143.34	26 52 45.7	333.4	70.61	15 8.6	55 28.8	I. S.
17	U	12 7.75	2.145	19 49 24.16	138.92	25 35 53.0	433.6	69.47	15 4.9	55 15.3	I.II. S.
18	L	0 33.02	2.066	20 16 42.81	134.16	−24 0 4.0	+ 522.6	68.23	15 1.5	55 2.6	II. S.
18	U	12 57.33	1.986	20 43 3.65	129.34	22 7 36.9	600.0	66.96	14 58.2	54 50.7	II.*N*.S.
19	L	1 20.69	1.908	21 8 27.31	124.66	20 0 51.0	665.9	65.72	14 55.3	54 39.9	II.N.*S*.
19	U	13 43.15	1.836	21 32 56.86	120.34	17 42 0.0	720.9	64.56	14 52.7	54 30.4	II.N.
20	L	2 4.80	1.772	21 56 37.28	116.50	−15 13 9.3	+ 766.0	63.51	14 50.5	54 22.2	II.N.
20	U	14 25.73	1.718	22 19 34.89	113.22	12 36 13.7	801.8	62.62	14 48.7	54 15.6	II.N.
21	L	2 46.07	1.674	22 41 56.92	110.57	9 52 56.9	829.6	61.90	14 47.4	54 10.8	II.N.
21	U	15 5.95	1.641	23 3 51.19	108.59	7 4 52.7	849.8	61.36	14 46.6	54 7.9	II.N.
22	L	3 25.50	1.620	23 25 25.88	107.30	− 4 13 26.7	+ 863.4	61.01	14 46.3	54 7.0	II.N.
22	U	15 44.87	1.611	23 46 49.52	106.75	− 1 19 57.4	870.4	60.88	14 46.7	54 8.3	II.N.
23	L	4 4.20	1.613	0 8 10.75	106.93	+ 1 34 20.6	871.4	60.96	14 47.7	54 12.0	II.N.
23	U	16 23.64	1.628	0 29 38.44	107.83	4 28 14.6	866.5	61.25	14 49.3	54 18.0	II.N.
24	L	4 43.33	1.656	0 51 21.69	109.52	+ 7 20 30.4	+ 855.2	61.76	14 51.7	54 26.7	II.N.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
July 24	L	4 43.33	1.656	0 51 21.69	109.52	+ 7 20 30.4	+ 855.2	61.76	14 51.7	54 26.7	II.N.
24	U	17 3.44	1.697	1 13 29.76	111.98	10 9 50.3	837.0	62.49	14 54.8	54 38.0	II.N.
25	L	5 24.12	1.751	1 36 12.12	115.22	12 54 48.9	811.4	63.43	14 58.6	54 51.9	II.N.
25	U	17 45.52	1.818	1 59 38.22	119.26	15 33 49.5	777.2	64.57	15 3.1	55 8.4	II.N.
26	L	6 7.81	1.898	2 23 57.38	124.06	+18 5 2.5	+ 733.2	65.89	15 8.2	55 27.3	II.N.
26	U	18 31.12	1.990	2 49 18.38	129.55	20 26 21.1	677.9	67.37	15 14.0	55 48.6	II.N.
27	L	6 55.59	2.090	3 15 48.82	135.61	22 35 19.8	609.6	68.96	15 20.4	56 12.1	II.N.
27	U	19 21.31	2.197	3 43 34.37	142.03	24 29 14.4	526.9	70.61	15 27.3	56 37.5	II.N.
28	L	7 48.32	2.305	4 12 37.70	148.51	+26 5 5.0	+ 428.8	72.24	15 34.7	57 4.4	II.N.
28	U	20 16.60	2.407	4 42 57.30	154.66	27 19 41.9	314.7	73.75	15 42.3	57 32.3	II.N.
29	L	8 46.04	2.496	5 14 26.59	160.04	28 9 56.4	185.4	75.03	15 50.0	58 0.7	II. S.
29	U	21 16.43	2.565	5 46 53.34	164.17	28 32 59.2	+ 43.2	76.00	15 57.7	58 29.1	II. S.
30	L	9 47.48	2.607	6 20 0.26	166.68	+28 26 36.1	− 108.2	76.58	16 5.3	58 56.7	II. S.
30	U	22 18.86	2.618	6 53 26.41	167.35	27 49 26.6	263.5	76.71	16 12.4	59 22.8	II. S.
31	L	10 50.19	2.599	7 26 49.67	166.23	26 41 17.7	417.1	76.41	16 18.9	59 46.6	II. S.
31	U	23 21.14	2.554	7 59 49.53	163.51	25 3 7.2	562.9	75.74	16 24.5	60 7.4	
Aug. 1	L	11 51.42	2.490	8 32 9.47	159.64	+22 56 59.2	− 695.9	74.79	16 29.2	60 24.6	
2	U	0 20.85	2.414	9 3 38.37	155.09	20 25 51.7	812.2	73.67	16 32.8	60 37.8	
2	L	12 49.34	2.334	9 34 10.86	150.31	17 33 21.6	909.4	72.49	16 35.2	60 46.6	
3	U	1 16.89	2.258	10 3 46.77	145.72	14 23 27.0	986.2	71.35	16 36.3	60 50.6	I. N.
3	L	13 43.57	2.190	10 32 30.22	141.62	+11 0 14.6	−1042.4	70.31	16 36.1	60 50.0	I. N.
4	U	2 9.49	2.133	11 0 28.24	138.20	7 27 48.5	1078.6	69.45	16 34.8	60 45.0	I. N.
4	L	14 34.81	2.090	11 27 49.94	135.58	3 50 3.6	1095.8	68.79	16 32.3	60 36.0	I. N.
5	U	2 59.70	2.061	11 54 45.53	133.84	+ 0 10 41.2	1095.1	68.37	16 28.8	60 23.2	I. N.
5	L	15 24.33	2.047	12 21 25.68	133.00	− 3 26 52.2	−1077.9	68.18	16 24.5	60 7.3	I. N.
6	U	3 48.88	2.047	12 48 0.96	133.02	6 59 25.3	1045.1	68.22	16 19.5	59 48.8	I. N.
6	L	16 13.52	2.061	13 14 41.49	133.86	10 24 0.1	998.3	68.47	16 13.9	59 28.3	I. N.
7	U	4 38.40	2.087	13 41 36.51	135.42	13 37 50.5	938.0	68.90	16 7.9	59 6.5	I. N.
7	L	17 3.65	2.123	14 8 53.94	137.57	−16 38 21.4	− 865.1	69.48	16 1.8	58 43.8	I. N.
8	U	5 29.37	2.165	14 36 39.93	140.14	19 23 6.4	780.5	70.16	15 55.5	58 20.8	I. N.
8	L	17 55.63	2.212	15 4 58.34	142.93	21 49 49.1	684.9	70.88	15 49.2	57 57.8	I. N.
9	U	6 22.45	2.258	15 33 50.29	145.68	23 56 24.4	579.5	71.58	15 43.1	57 35.3	I. N.
9	L	18 49.80	2.298	16 3 15.58	148.12	−25 41 2.5	− 465.6	72.18	15 37.1	57 13.5	I. N.
10	U	7 17.57	2.328	16 33 2.68	149.94	27 2 12.1	345.2	72.62	15 31.4	56 52.5	I. N.
10	L	19 45.62	2.345	17 3 8.83	150.91	27 58 48.1	220.4	72.83	15 26.0	56 32.6	I. N.
11	U	8 13.77	2.344	17 33 20.62	150.86	28 30 16.0	− 94.1	72.79	15 20.9	56 13.8	I. *N*.S.
11	L	20 41.80	2.324	18 3 25.09	149.69	−28 36 34.7	+ 30.7	72.46	15 16.1	55 56.3	I. S.
12	U	9 9.48	2.287	18 33 8.97	147.44	28 18 18.3	151.2	71.85	15 11.6	55 39.9	I. S.
12	L	21 36.62	2.234	19 2 20.14	144.28	27 36 33.2	265.0	71.01	15 7.5	55 24.9	I. S.
13	U	10 3.05	2.169	19 30 48.57	140.38	26 32 52.9	370.1	69.98	15 3.8	55 11.1	I. S.
13	L	22 28.65	2.097	19 58 27.13	136.00	−25 9 10.7	+ 465.2	68.82	15 0.4	54 58.5	I. S.
14	U	10 53.36	2.021	20 25 11.83	131.43	23 27 31.9	549.4	67.58	14 57.2	54 46.9	I. S.
14	L	23 17.15	1.945	20 51 1.52	126.88	21 30 8.1	622.7	66.35	14 54.4	54 36.7	I. S.
15	U	11 40.05	1.873	21 15 57.75	122.55	19 19 9.1	685.3	65.15	14 51.9	54 27.6	I. S.
16	L	0 2.13	1.807	21 40 4.05	118.58	−16 56 40.8	+ 737.7	64.06	14 49.8	54 19.7	I.*II*. S.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Aug. 16	L	0 2.13	1.807	21 40 4.05	118.58	−16 56 40.8	+ 737.7	64.06	14 49.8	54 19.7	I.*II*. S.
16	U	12 23.45	1.749	22 3 25.49	115.05	14 24 41.9	780.5	63.08	14 48.0	54 13.0	II.*N*.S.
17	L	0 44.14	1.700	22 26 8.10	112.12	11 45 3.3	814.4	62.25	14 46.5	54 7.7	II.N.*S*.
17	U	13 4.29	1.661	22 48 18.88	109.76	8 59 27.1	840.2	61.58	14 45.4	54 3.7	II.N.
18	L	1 24.04	1.632	23 10 5.16	108.05	− 6 9 27.7	+ 858.4	61.10	14 44.7	54 1.2	II.N.
18	U	13 43.50	1.614	23 31 34.58	106.97	3 16 32.8	869.6	60.82	14 44.5	54 0.1	II.N.
19	L	2 2.82	1.607	23 52 55.08	106.56	− 0 22 5.6	873.9	60.72	14 44.6	54 0.8	II.N.
19	U	14 22.12	1.612	0 14 14.69	106.83	+ 2 32 34.5	871.7	60.83	14 45.3	54 3.3	II.N.
20	L	2 41.55	1.628	0 35 41.61	107.79	+ 5 26 9.4	+ 863.0	61.14	14 46.5	54 7.7	II.N.
20	U	15 1.23	1.655	0 57 24.27	109.46	8 17 20.4	847.6	61.66	14 48.3	54 14.1	II.N.
21	L	3 21.32	1.694	1 19 31.14	111.81	11 4 45.2	825.2	62.38	14 50.6	54 22.7	II.N.
21	U	15 41.95	1.746	1 42 10.82	114.91	13 46 56.1	795.3	63.29	14 53.5	54 33.5	II.N.
22	L	4 3.27	1.810	2 5 31.85	118.71	+16 22 17.0	+ 756.8	64.39	14 57.1	54 46.7	II.N.
22	U	16 25.42	1.884	2 29 42.59	123.19	18 49 1.3	708.9	65.66	15 1.4	55 2.3	II.N.
23	L	4 48.52	1.968	2 54 50.74	128.27	21 5 8.9	650.5	67.06	15 6.3	55 20.2	II.N.
23	U	17 12.69	2.060	3 21 2.90	133.83	23 8 25.7	580.3	68.56	15 11.8	55 40.5	II.N.
24	L	5 38.00	2.158	3 48 23.92	139.70	+24 56 23.7	+ 497.1	70.11	15 18.0	56 3.1	II.N.
24	U	18 4.49	2.256	4 16 55.93	145.61	26 26 22.2	400.2	71.63	15 24.7	56 27.8	II.N.
25	L	6 32.14	2.350	4 46 37.62	151.25	27 35 33.9	289.4	73.04	15 31.9	56 54.4	II.N.
25	U	19 0.85	2.433	5 17 23.30	156.21	28 21 13.3	165.0	74.27	15 39.6	57 22.5	II.N.
26	L	7 30.45	2.498	5 49 2.73	160.14	+28 40 49.2	+ 29.1	75.21	15 47.6	57 51.8	II. S.
26	U	20 0.71	2.541	6 21 21.38	162.71	28 32 18.1	− 115.4	75.80	15 55.7	58 21.7	II. S.
27	L	8 31.32	2.558	6 54 1.65	163.72	27 54 19.8	264.6	76.02	16 3.9	58 51.5	II. S.
27	U	21 1.99	2.549	7 26 44.76	163.19	26 46 27.8	413.6	75.86	16 11.8	59 20.6	II. S.
28	L	9 32.41	2.517	7 59 13.00	161.31	+25 9 14.8	− 557.3	75.36	16 19.3	59 48.1	II. S.
28	U	22 2.33	2.468	8 31 11.66	158.33	23 4 12.5	691.0	74.60	16 26.1	60 13.3	II. S.
29	L	10 31.59	2.408	9 2 30.42	154.71	20 33 44.7	810.9	73.68	16 32.1	60 35.4	II. S.
29	U	23 0.10	2.344	9 33 3.81	150.83	17 40 57.1	913.9	72.69	16 37.1	60 53.5	II. S.
30	L	11 27.84	2.281	10 2 50.95	147.07	+14 29 25.6	− 998.0	71.73	16 40.8	61 7.2	
30	U	23 54.86	2.224	10 31 54.93	143.69	11 3 5.6	1061.9	70.86	16 43.2	61 15.9	
31	L	12 21.26	2.178	11 0 21.80	140.90	7 26 2.4	1105.2	70.15	16 44.1	61 19.2	
Sept. 1	U	0 47.18	2.144	11 28 19.64	138.87	+ 3 42 23.4	1128.0	69.63	16 43.6	61 17.3	
1	L	13 12.78	2.124	11 55 57.79	137.63	− 0 3 48.0	−1130.7	69.34	16 41.6	61 10.0	I. N.
2	U	1 38.21	2.117	12 23 26.14	137.23	3 48 35.8	1114.1	69.24	16 38.3	60 57.9	I. N.
2	L	14 3.64	2.124	12 50 54.54	137.63	7 28 15.0	1079.4	69.37	16 33.8	60 41.4	I. N.
3	U	2 29.23	2.143	13 18 32.29	138.77	10 59 13.4	1027.5	69.70	16 28.3	60 21.2	I. N.
3	L	14 55.11	2.172	13 46 27.64	140.54	−14 18 13.2	− 959.9	70.20	16 22.0	59 57.9	I. N.
4	U	3 21.39	2.209	14 14 47.26	142.79	17 22 11.3	877.5	70.81	16 15.0	59 32.5	I. N.
4	L	15 48.16	2.251	14 43 35.68	145.30	20 8 21.0	781.9	71.48	16 7.6	59 5.4	I. N.
5	U	4 15.43	2.294	15 12 54.75	147.85	22 34 14.0	675.0	72.16	16 0.0	58 37.4	I. N.
5	L	16 43.19	2.332	15 42 43.21	150.15	−24 37 43.6	− 558.4	72.76	15 52.4	58 9.4	I. N.
6	U	5 11.36	2.361	16 12 56.40	151.93	26 17 7.1	434.5	73.21	15 44.8	57 41.7	I. N.
6	L	17 39.81	2.378	16 43 26.31	152.90	27 31 12.7	305.8	73.47	15 37.5	57 14.9	I. N.
7	U	6 8.36	2.378	17 14 2.21	152.90	28 19 20.5	175.3	73.47	15 30.6	56 49.5	I. N.
7	L	18 36.80	2.359	17 44 31.57	151.80	−28 41 27.0	− 46.1	73.18	15 24.0	56 25.3	I. N.*S*.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Sept. 7	L	18 36.80	2.359	17 44 31.57	151.80	−28 41 27.0	− 46.1	73.18	15 24.0	56 25.3	I. N.S.
8	U	7 4.91	2.323	18 14 41.26	149.63	28 38 4.1	+ 79.1	72.62	15 17.9	56 3.0	I. S.
8	L	19 32.49	2.271	18 44 19.04	146.50	28 10 15.7	197.6	71.81	15 12.4	55 42.5	I. S.
9	U	7 59.37	2.207	19 13 14.55	142.63	27 19 33.6	307.7	70.78	15 7.3	55 24.0	I. S.
9	L	20 25.42	2.134	19 41 20.22	138.25	−26 7 48.8	+ 408.0	69.61	15 2.8	55 7.5	I. S.
10	U	8 50.57	2.057	20 8 31.56	133.61	24 37 4.0	497.7	68.36	14 58.9	54 53.0	I. S.
10	L	21 14.79	1.980	20 34 46.94	128.96	22 49 27.5	576.7	67.09	14 55.4	54 40.3	I. S.
11	U	9 38.10	1.905	21 0 7.49	124.49	20 47 6.9	645.0	65.84	14 52.4	54 29.4	I. S.
11	L	22 0.55	1.837	21 24 36.25	120.36	−18 32 6.1	+ 703.4	64.67	14 50.0	54 20.4	I. S.
12	U	10 22.21	1.775	21 48 18.02	116.68	16 6 22.1	752.4	63.61	14 47.9	54 12.8	I. S.
12	L	22 43.19	1.723	22 11 18.59	113.51	13 31 44.9	792.4	62.69	14 46.3	54 6.9	I. S.
13	U	11 3.60	1.680	22 33 44.60	110.93	10 49 57.3	824.2	61.93	14 45.1	54 2.6	I. S.
13	L	23 23.55	1.647	22 55 43.07	108.95	− 8 2 35.3	+ 848.2	61.34	14 44.3	53 59.7	I. S.
14	U	11 43.16	1.624	23 17 21.38	107.56	5 11 9.6	864.8	60.94	14 43.9	53 58.2	I. S.
15	L	0 2.56	1.612	23 38 47.06	106.83	− 2 17 6.8	874.4	60.72	14 43.9	53 58.1	I.II.N.S.
15	U	12 21.88	1.610	0 0 7.70	106.73	+ 0 38 9.0	877.1	60.70	14 44.2	53 59.3	II.N.
16	L	0 41.25	1.619	0 21 31.06	107.27	+ 3 33 15.3	+ 872.9	60.87	14 44.9	54 1.9	II.N.
16	U	13 0.79	1.639	0 43 4.87	108.47	6 26 48.5	861.5	61.23	14 46.0	54 5.9	II.N.
17	L	1 20.63	1.670	1 4 56.93	110.32	9 17 23.0	842.9	61.79	14 47.5	54 11.4	II.N.
17	U	13 40.91	1.711	1 27 15.04	112.82	12 3 29.4	816.7	62.54	14 49.5	54 18.5	II.N.
18	L	2 1.74	1.763	1 50 6.92	115.95	+14 43 32.5	+ 782.3	63.45	14 51.8	54 27.2	II.N.
18	U	14 23.26	1.825	2 13 40.03	119.68	17 15 49.3	738.9	64.54	14 54.7	54 37.6	II.N.
19	L	2 45.59	1.897	2 38 1.36	123.97	19 38 29.0	685.9	65.75	14 58.0	54 49.7	II.N.
19	U	15 8.81	1.976	3 3 17.04	128.71	21 49 30.4	622.4	67.08	15 1.8	55 3.8	II.N.
20	L	3 33.02	2.060	3 29 31.83	133.79	+23 46 42.6	+ 547.6	68.47	15 6.1	55 19.7	II.N.
20	U	15 58.26	2.147	3 56 48.62	139.02	25 27 47.0	461.1	69.87	15 11.0	55 37.6	II.N.
21	L	4 24.53	2.232	4 25 7.60	144.13	26 50 18.9	362.3	71.22	15 16.5	55 57.6	II.N.
21	U	16 51.79	2.310	4 54 25.81	148.83	27 51 53.9	251.6	72.43	15 22.4	56 19.4	II.N.
22	L	5 19.92	2.377	5 24 36.67	152.84	+28 30 15.4	+ 130.2	73.45	15 28.8	56 42.9	II.N.
22	U	17 48 76	2.427	5 55 29.94	155.85	28 43 23.8	− 0.1	74.21	15 35.7	57 8.1	II.N.S.
23	L	6 18.09	2.457	6 26 52.50	157.69	28 29 47.1	136.8	74.66	15 42.9	57 34.7	II. S.
23	U	18 47.65	2.466	6 58 29.35	158.23	27 48 29.8	276.4	74.79	15 50.4	58 2.3	II. S.
24	L	7 17.20	2.454	7 30 5.26	157.55	+26 39 19.0	− 415.0	74.60	15 58.1	58 30.4	II. S.
24	U	19 46.50	2.426	8 1 26.41	155.81	25 2 47.6	549.1	74.14	16 5.7	58 58.4	II. S.
25	L	8 15.37	2.385	8 32 21.82	153.31	23 0 12.1	675.2	73.49	16 13.2	59 25.9	II. S.
25	U	20 43.69	2.335	9 2 44.12	150.36	20 33 28.5	790.0	72.71	16 20.3	59 52.0	II. S.
26	L	9 11.41	2.284	9 32 30.01	147.29	+17 45 6.2	− 891.2	71.90	16 26.8	60 16.0	II. S.
26	U	21 38.53	2.236	10 1 39.87	144.40	14 38 1.2	976.9	71.13	16 32.6	60 37.1	II. S.
27	L	10 5.11	2.195	10 30 17.30	141.93	11 15 30.5	1045.3	70.47	16 37.4	60 54.7	II. S
27	U	22 31.25	2.164	10 58 28.38	140.04	7 41 7.2	1095.4	69.96	16 41.0	61 7.9	II. S.
28	L	10 57.09	2.144	11 26 21.03	138.87	+ 3 58 36.0	−1126.5	69.64	16 43.3	61 16.4	II. S.
28	U	23 22.77	2.138	11 54 4.30	138.49	+ 0 11 49.9	1137.8	69.52	16 44.2	61 19.7	
29	L	11 48.45	2.145	12 21 47.76	138.91	− 3 35 13.3	1129.3	69.63	16 43.7	61 17.6	
30	U	0 14.29	2.165	12 49 40.95	140.09	7 18 34.1	1100.9	69.95	16 41.7	61 10.3	
30	L	12 40.45	2.196	13 17 52.85	141.99	−10 54 16.2	−1052.9	70.45	16 38.3	60 57.8	

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Sept. 30	L	12 40.45	2.196	13 17 52.85	141.99	−10 54 16.2	−1052.9	70.45	16 38.3	60 57.8	
Oct. 1	U	1 7.04	2.237	13 46 31.19	144.48	14 18 28.7	986.1	71.10	16 33.6	60 40.6	I. N.
1	L	13 34.17	2.285	14 15 41.86	147.35	17 27 32.3	901.6	71.85	16 27.7	60 19.3	I. N.
2	U	2 1.90	2.335	14 45 28.20	150.37	20 18 3.4	801.0	72.64	16 21.0	59 54.6	I. N.
2	L	14 30.22	2.383	15 15 50.25	153.24	−22 47 0.6	− 686.4	73.40	16 13.6	59 27.5	I. N.
3	U	2 59.07	2.423	15 46 44.26	155.64	24 51 51.3	560.4	74.03	16 5.8	58 58.7	I. N.
3	L	15 28.32	2.450	16 18 2.59	157.25	26 30 38.3	426.3	74.47	15 57.7	58 28.8	I. N.
4	U	3 57.79	2.459	16 49 33.94	157.78	27 42 6.4	287.9	74.62	15 49.5	57 58.7	I. N.
4	L	16 27.25	2.447	17 21 4.41	157.08	−28 25 45.9	− 148.9	74.48	15 41.4	57 29.1	I. N.
5	U	4 56.44	2.414	17 52 18.82	155.11	28 41 53.8	− 13.3	74.01	15 33.6	57 0.6	I. N.
5	L	17 25.12	2.361	18 23 2.45	151.97	28 31 29.9	+ 115.9	73.24	15 26.2	56 33.4	I. S.
6	U	5 53.07	2.293	18 53 2.47	147.88	27 56 8.9	235.9	72.21	15 19.3	56 8.1	I. S.
6	L	18 20.14	2.215	19 22 9.19	143.13	−26 57 51.4	+ 345.2	71.01	15 13.0	55 44.9	I. S.
7	U	6 46.21	2.131	19 50 16.48	138.04	25 38 53.2	442.6	69.67	15 7.3	55 24.0	I. S.
7	L	19 11.26	2.044	20 17 21.76	132.86	24 1 35.5	528.4	68.29	15 2.3	55 5.6	I. S.
8	U	7 35.29	1.961	20 43 25.65	127.83	22 8 17.8	602.7	66.92	14 57.9	54 49.5	I. S.
8	L	19 58.35	1.883	21 8 31.26	123.17	−20 1 13.2	+ 666.3	65.62	14 54.2	54 35.9	I. S.
9	U	8 20.52	1.813	21 32 43.61	118.98	17 42 25.0	720.1	64.42	14 51.1	54 24.7	I. S.
9	L	20 41.92	1.753	21 56 8.98	115.36	15 13 46.2	764.9	63.37	14 48.7	54 15.7	I. S.
10	U	9 2.65	1.703	22 18 54.48	112.34	12 37 0.3	801.5	62.48	14 46.9	54 9.0	I. S.
10	L	21 22.84	1.664	22 41 7.70	109.97	− 9 53 42.5	+ 830.3	61.76	14 45.6	54 4.3	I. S.
11	U	9 42.63	1.635	23 2 56.47	108.28	7 5 21.0	852.0	61.24	14 44.9	54 1.6	I. S.
11	L	22 2.14	1.618	23 24 28.68	107.21	4 13 19.8	867.0	60.90	14 44.6	54 0.7	I. S.
12	U	10 21.51	1.612	23 45 52.26	106.83	− 1 18 59.8	875.2	60.75	14 44.8	54 1.4	I. S.
12	L	22 40.86	1.616	0 7 15.14	107.10	+ 1 36 17.8	+ 876.6	60.81	14 45.5	54 3.8	I. S.
13	U	11 0.34	1.632	0 28 45.20	108.02	4 31 11.6	871.2	61.06	14 46.5	54 7.6	I. S.
13	L	23 20.07	1.658	0 50 30.29	109.60	7 24 16.0	858.3	61.51	14 47.9	54 12.7	I. *N*.S.
14	U	11 40.17	1.695	1 12 38.10	111.81	10 14 1.1	837.8	62.14	14 49.6	54 19.1	I.*II*.N.*S*.
15	L	0 0.78	1.742	1 35 16.27	114.65	+12 58 50.6	+ 808.9	62.95	14 51.7	54 26.7	II.N.
15	U	12 22.01	1.799	1 58 32.06	118.07	15 37 0.2	771.1	63.92	14 54.1	54 35.4	II.N.
16	L	0 43.98	1.865	2 22 32.24	122.04	18 6 37.2	723.4	65.03	14 56.7	54 45.2	II.N.
16	U	13 6.79	1.938	2 47 22.72	126.44	20 25 40.1	665.3	66.25	14 59.7	54 56.0	II.N.
17	L	1 30.51	2.016	3 13 8.14	131.17	+22 31 58.4	+ 595.8	67.55	15 3.0	55 8.1	II.N.
17	U	13 55.19	2.097	3 39 51.30	136.04	24 23 15.2	514.9	68.87	15 6.6	55 21.4	II.N.
18	L	2 20.84	2.177	4 7 32.65	140.82	25 57 10.3	422.2	70.15	15 10.5	55 35.7	II.N.
18	U	14 47.41	2.251	4 36 9.60	145.25	27 11 25.1	318.3	71.32	15 14.7	55 51.3	II.N.
19	L	3 14.81	2.314	5 5 36.39	149.07	+28 3 49.4	+ 204.1	72.33	15 19.3	56 8.0	II.N.
19	U	15 42.89	2.363	5 35 43.83	152.00	28 32 30.4	+ 81.4	73.10	15 24.2	56 26.0	II.N.
20	L	4 11.44	2.393	6 6 20.02	153.84	28 35 59.8	− 47.3	73.59	15 29.4	56 45.1	II.N.
20	U	16 40.24	2.404	6 37 11.13	154.48	28 13 22.7	179.1	73.77	15 34.9	57 5.3	II.*N*.S.
21	L	5 9.06	2.395	7 8 2.91	153.95	+27 24 21.2	− 310.9	73.66	15 40.7	57 26.6	II. S.
21	U	17 37.66	2.370	7 38 42.18	152.42	26 9 16.7	439.1	73.29	15 46.7	57 48.7	II. S.
22	L	6 5.88	2.331	8 8 58.06	150.11	24 29 6.0	561.3	72.72	15 52.9	58 11.3	II. S.
22	U	18 33.58	2.285	8 38 42.98	147.31	22 25 19.4	674.9	72.00	15 59.1	58 34.2	II. S.
23	L	7 0.70	2.235	9 7 52.93	144.34	+19 59 51.7	− 777.9	71.23	16 5.3	58 57.0	II. S.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Oct. 23	L	7 0.70	2.235	9 7 52.93	144.34	+19 59 51.7	− 777.9	71.23	16 5.3	58 57.0	II. S.
23	U	19 27.24	2.187	9 36 27.57	141.47	17 14 58.7	868.9	70.48	16 11.4	59 19.1	II. S.
24	L	7 53.23	2.146	10 4 29.61	138.96	14 13 11.5	946.7	69.79	16 17.1	59 40.1	II. S.
24	U	20 18.77	2.113	10 32 4.47	136.96	10 57 13.9	1010.4	69.24	16 22.3	59 59.4	II. S.
25	L	8 43.98	2.091	10 59 19.44	135.66	+ 7 30 0.7	−1059.1	68.87	16 27.0	60 16.5	II. S.
25	U	21 9.00	2.082	11 26 23.28	135.12	3 54 37.6	1091.9	68.70	16 30.9	60 30.6	II. S.
26	L	9 34.00	2.087	11 53 25.70	135.42	+ 0 14 20.7	1107.9	68.75	16 33.8	60 41.2	II. S.
26	U	21 59.14	2.106	12 20 36.77	136.56	− 3 27 22.2	1106.1	69.02	16 35.6	60 47.9	II. S.
27	L	10 24.60	2.138	12 48 6.55	138.53	− 7 6 54.4	−1085.9	69.51	16 36.2	60 50.2	II. S.
27	U	22 50.53	2.184	13 16 4.61	141.25	10 40 29.2	1046.5	70.19	16 35.6	60 47.9	II. S.
28	L	11 17.06	2.240	13 44 39.24	144.61	14 4 13.9	987.7	71.04	16 33.7	60 40.9	
28	U	23 44.31	2.303	14 13 56.87	148.39	17 14 14.9	909.3	71.99	16 30.5	60 29.4	
29	L	12 12.33	2.368	14 44 1.04	152.31	−20 6 44.1	− 812.5	72.98	16 26.2	60 13.6	
30	U	0 41.12	2.430	15 14 51.59	156.04	22 38 7.4	698.7	73.92	16 20.9	59 54.0	
30	L	13 10.60	2.482	15 46 23.89	159.19	24 45 16.3	570.7	74.72	16 14.7	59 31.2	I. N.
31	U	1 40.63	2.518	16 18 28.48	161.37	26 25 40.0	431.8	75.27	16 7.7	59 5.7	I. N.
31	L	14 10.96	2.532	16 50 51.50	162.23	−27 37 36.1	− 286.8	75.51	16 0.3	58 38.4	I. N.
Nov. 1	U	2 41.31	2.521	17 23 15.74	161.56	28 20 18.4	− 140.4	75.39	15 52.5	58 10.0	I. N.
1	L	15 11.37	2.485	17 55 22.65	159.34	28 34 0.2	+ 2.6	74.88	15 44.7	57 41.3	I. N.
2	U	3 40.85	2.425	18 26 54.41	155.73	28 19 49.2	137.7	74.04	15 37.0	57 12.9	I. N.
2	L	16 9.49	2.346	18 57 35.87	151.02	−27 39 38.1	+ 262.0	72.91	15 29.5	56 45.3	I. S.
3	U	4 37.11	2.256	19 27 16.05	145.58	26 35 50.4	373.6	71.55	15 22.3	56 19.2	I. S.
3	L	17 3.61	2.160	19 55 48.48	139.79	25 11 6.0	471.5	70.08	15 15.7	55 54.8	I. S.
4	U	5 28.94	2.063	20 23 11.08	133.99	23 28 9.0	555.8	68.57	15 9.6	55 32.6	I. S.
4	L	17 53.14	1.971	20 49 25.41	128.45	−21 29 36.5	+ 627.5	67.09	15 4.2	55 12.8	I. S.
5	U	6 16.28	1.887	21 14 35.86	123.36	19 17 55.7	687.5	65.71	14 59.5	54 55.5	I. S.
5	L	18 38.47	1.812	21 38 48.77	118.89	16 55 18.0	737.2	64.46	14 55.5	54 40.8	I. S.
6	U	6 59.82	1.749	22 2 11.83	115.06	14 23 40.1	777.7	63.38	14 52.3	54 28.9	I. S.
6	L	19 20.49	1.698	22 24 53.28	111.97	−11 44 46.0	+ 810.0	62.47	14 49.7	54 19.6	I. S.
7	U	7 40.60	1.658	22 47 1.84	109.59	9 0 7.5	835.2	61.75	14 47.9	54 12.9	I. S.
7	L	20 0.32	1.630	23 8 46.28	107.94	6 11 8.3	853.6	61.25	14 46.8	54 8.8	I. S.
8	U	8 19.78	1.615	23 30 15.37	107.02	3 19 5.8	865.8	60.95	14 46.3	54 7.1	I. S.
8	L	20 39.13	1.612	23 51 37.82	106.84	− 0 25 14.5	+ 871.7	60.86	14 46.5	54 7.7	I. S.
9	U	8 58.51	1.621	0 13 2.26	107.35	+ 2 29 11.0	871.5	60.98	14 47.3	54 10.5	I. S.
9	L	21 18.07	1.640	0 34 37.20	108.57	5 22 53.8	864.5	61.30	14 48.6	54 15.3	I. S.
10	U	9 37.94	1.674	0 56 31.08	110.51	8 14 32.4	850.6	61.82	14 50.4	54 21.9	I. S.
10	L	21 58.26	1.716	1 18 52.18	113.11	+11 2 38.1	+ 828.9	62.53	14 52.6	54 30.0	I. S.
11	U	10 19.17	1.770	1 41 48.52	116.39	13 45 32.3	798.6	63.43	14 55.2	54 39.6	I. S.
11	L	22 40.80	1.835	2 5 27.72	120.25	16 21 26.6	758.8	64.49	14 58.2	54 50.4	I. *N*.S.
12	U	11 3.24	1.908	2 29 56.57	124.64	18 48 20.5	708.4	65.67	15 1.3	55 2.1	I. N.S.
12	L	23 26.61	1.988	2 55 20.80	129.45	+21 4 1.6	+ 646.5	66.96	15 4.7	55 14.6	I. N.
13	U	11 50.97	2.072	3 21 44.34	134.49	23 6 7.6	572.4	68.30	15 8.4	55 28.0	*I*.II.N.
14	L	0 16.34	2.156	3 49 8.77	139.55	24 52 9.0	485.7	69.63	15 12.2	55 41.8	II.N.
14	U	12 42.69	2.236	4 17 32.65	144.36	26 19 35.0	386.5	70.87	15 16.1	55 56.1	II.N.
15	L	1 9.95	2.306	4 46 50.92	148.58	+27 26 0.7	+ 275.9	71.96	15 20.1	56 10.8	II.N.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Nov. 15	U	13 37.96	2.361	5 16 54.80	151.90	+28 9 17.1	+ 155.4	72.82	15 24.1	56 25.6	II.N.
16	L	2 6.53	2.397	5 47 32.00	154.08	28 27 41.4	+ 27.7	73.39	15 28.2	56 40.7	II.N.
16	U	14 35.41	2.412	6 18 27.80	154.97	28 20 6.0	− 104.0	73.65	15 32.3	56 55.8	II.N.
17	L	3 4.34	2.405	6 49 26.31	154.55	27 46 5.1	235.9	73.59	15 36.5	57 11.0	II.*N*.S.
17	U	15 33.06	2.378	7 20 12.35	152.93	+26 45 56.5	− 364.7	73.22	15 40.7	57 26.4	II. S.
18	L	4 1.35	2.335	7 50 32.93	150.36	25 20 38.8	487.0	72.61	15 44.9	57 41.9	II. S.
18	U	16 29.06	2.282	8 20 18.45	147.15	23 31 45.0	600.3	71.83	15 49.1	57 57.3	II. S.
19	L	4 56.10	2.223	8 49 23.28	143.64	21 21 14.2	702.9	70.96	15 53.3	58 12.7	II. S.
19	U	17 22.43	2.165	9 17 45.69	140.13	+18 51 23.2	− 793.6	70.07	15 57.4	58 27.9	II. S.
20	L	5 48.08	2.112	9 45 27.56	136.91	16 4 39.2	871.6	69.25	16 1.5	58 42.7	II. S.
20	U	18 13.15	2.067	10 12 33.68	134.20	13 3 34.4	936.9	68.53	16 5.4	58 57.2	II. S.
21	L	6 37.73	2.033	10 39 10.99	132.14	9 50 44.6	989.1	67.98	16 9.1	59 10.8	II. S.
21	U	19 1.98	2.012	11 5 28.24	130.86	+ 6 28 47.6	−1028.1	67.62	16 12.5	59 23.4	II. S.
22	L	7 26.06	2.005	11 31 35.17	130.44	+ 3 0 24.5	1053.4	67.49	16 15.6	59 34.6	II. S.
22	U	19 50.14	2.012	11 57 42.28	130.90	− 0 31 38.7	1064.7	67.59	16 18.2	59 44.1	II. S.
23	L	8 14.40	2.035	12 24 0.33	132.27	4 4 28.8	1061.1	67.92	16 20.2	59 51.5	II. S.
23	U	20 39.03	2.072	12 50 40.12	134.51	− 7 35 2.9	−1041.9	68.48	16 21.5	59 56.4	II. S.
24	L	9 4.18	2.123	13 17 51.92	137.58	11 0 7.8	1006.1	69.25	16 22.1	59 58.7	II. S.
24	U	21 30.02	2.186	13 45 44.92	141.35	14 16 19.1	952.8	70.20	16 21.9	59 57.8	II. S.
25	L	9 56.67	2.257	14 14 26.63	145.65	17 20 3.4	881.5	71.27	16 20.8	59 53.7	II. S.
25	U	22 24.21	2.333	14 44 1.84	150.22	−20 7 42.8	− 792.0	72.40	16 18.8	59 46.2	II. S.
26	L	10 52.66	2.408	15 14 31.68	154.70	22 35 42.6	685.2	73.49	16 15.8	59 35.3	II.N.
26	U	23 21.96	2.473	15 45 52.61	158.66	24 40 42.5	562.5	74.45	16 12.0	59 21.3	
27	L	11 51.96	2.523	16 17 55.91	161.67	26 19 49.7	426.9	75.18	16 7.3	59 4.3	
28	U	0 22.44	2.551	16 50 27.58	163.34	−27 30 55.0	− 282.9	75.59	16 2.0	58 44.7	
28	L	12 53.08	2.552	17 23 9.52	163.36	28 12 43.9	− 135.2	75.61	15 56.1	58 22.9	
29	U	1 23.55	2.523	17 55 41.28	161.64	28 25 5.5	+ 10.8	75.22	15 49.7	57 59.7	I. N.
29	L	13 53.52	2.467	18 27 42.57	158.31	28 8 51.6	150.0	74.44	15 43.1	57 35.3	I. N.
30	U	2 22.69	2.391	18 58 55.74	153.67	−27 25 48.8	+ 278.4	73.33	15 36.4	57 10.6	I. N.
30	L	14 50.83	2.298	19 29 7.30	148.14	26 18 23.6	393.4	71.98	15 29.6	56 45.9	I. S.
Dec. 1	U	3 17.82	2.198	19 58 8.91	142.11	24 49 26.3	493.6	70.48	15 23.1	56 22.0	I. S.
1	L	15 43.58	2.096	20 25 57.27	135.98	23 1 55.4	579.0	68.93	15 16.9	55 59.2	I. S.
2	U	4 8.14	1.999	20 52 33.28	130.10	−20 58 45.2	+ 650.4	67.40	15 11.1	55 37.8	I. S.
2	L	16 31.57	1.908	21 18 1.23	124.66	18 42 37.3	708.8	65.96	15 5.8	55 18.5	I. S.
3	U	4 53.98	1.828	21 42 27.59	119.86	16 15 57.7	755.9	64.66	15 1.1	55 1.3	I. S.
3	L	17 15.50	1.760	22 6 0.43	115.75	13 40 53.7	793.1	63.53	14 57.1	54 46.5	I. S.
4	U	5 36.27	1.705	22 28 48.58	112.41	−10 59 16.4	+ 821.7	62.60	14 53.8	54 34.3	I. S.
4	L	17 56.45	1.662	22 51 1.26	109.84	8 12 42.2	842.8	61.86	14 51.2	54 24.8	I. S.
5	U	6 16.21	1.631	23 12 47.89	108.07	5 22 36.3	857.2	61.34	14 49.3	54 18.1	I. S.
5	L	18 35.68	1.616	23 34 17.80	107.06	− 2 30 14.9	865.4	61.04	14 48.3	54 14.2	I. S.
6	U	6 55.03	1.612	23 55 40.35	106.83	+ 0 23 10.3	+ 867.9	60.96	14 48.0	54 13.0	I. S.
6	L	19 14.41	1.621	0 17 4.73	107.36	3 16 30.0	864.5	61.09	14 48.4	54 14.5	I. S.
7	U	7 33.98	1.642	0 38 40.12	108.66	6 8 33.2	855.0	61.44	14 49.5	54 18.6	I. S.
7	L	19 53.88	1.676	1 0 35.62	110.73	8 58 4.8	839.0	62.00	14 51.3	54 25.2	I. S.
8	U	8 14.26	1.723	1 23 0.20	113.51	+11 43 41.7	+ 815.8	62.77	14 53.7	54 34.2	I. S.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Dec. 8	L	20 35.27	1.781	1 46 2.62	11[illegible].03	+14 23 51.4	+ 784.3	63.73	14 56.7	54 45.3	I. S.
9	U	8 57.05	1.851	2 9 51.25	121.20	16 56 47.9	743.4	64.85	15 0.2	54 58.1	I. S.
9	L	21 19.72	1.930	2 34 33.66	125.96	19 20 31.6	691.9	66.12	15 4.2	55 12.6	I. S.
10	U	9 43.40	2.017	3 0 16.21	131.18	21 32 48.0	628.7	67.49	15 8.5	55 28.4	I. S.
10	L	22 8.14	2.108	3 27 3.35	136.65	+23 31 8.4	+ 552.6	68.91	15 13.1	55 45.2	I. *N*.S.
11	U	10 33.99	2.200	3 54 56.81	142.20	25 12 54.1	462.8	70.31	15 17.9	56 2.8	I. N.*S*.
11	L	23 0.91	2.286	4 23 54.80	147.38	26 35 22.1	359.6	71.61	15 22.8	56 20.7	I. N.
12	U	11 28.81	2.361	4 53 51.38	151.90	27 35 54.6	243.8	72.73	15 27.7	56 38.7	I. N.
12	L	23 57.51	2.419	5 24 36.20	155.36	+28 12 11.8	+ 117.5	73.59	15 32.5	56 56.3	*I*.II.N.
13	U	12 26.77	2.454	5 55 54.86	157.50	28 22 24.5	− 16.3	74.11	15 37.1	57 13.5	II.N.
14	L	0 56.30	2.464	6 27 30.19	158.13	28 5 25.7	153.7	74.28	15 41.6	57 29.9	II.N.
14	U	13 25.81	2.449	6 59 4.00	157.26	27 20 59.3	290.4	74.09	15 45.8	57 45.3	II.N.
15	L	1 55.01	2.413	7 30 19.19	155.06	+26 9 41.3	− 421.7	73.58	15 49.7	57 59.5	II.*N*.S.
15	U	14 23.67	2.360	8 1 1.49	151.84	24 32 56.3	544.2	72.81	15 53.2	58 12.5	II. S.
16	L	2 51.61	2.296	8 31 0.84	147.97	22 32 47.5	655.2	71.87	15 56.4	58 24.1	II. S.
16	U	15 18.75	2.227	9 0 11.75	143.83	20 11 45.9	752.7	70.86	15 59.2	58 34.4	II. S.
17	L	3 45.06	2.159	9 28 33.15	139.78	+17 32 38.1	− 836.1	69.84	16 1.6	58 43.4	II. S.
17	U	16 10.60	2.098	9 56 7.79	136.07	14 38 18.0	904.8	68.91	16 3.8	58 51.2	II. S.
18	L	4 35.45	2.046	10 23 1.34	132.96	11 31 39.9	959.2	68.12	16 5.5	58 57.6	II. S.
18	U	16 59.75	2.006	10 49 21.68	130.56	8 15 34.0	999.5	67.51	16 7.0	59 3.0	II. S.
19	L	5 23.66	1.980	11 15 18.21	128.99	+ 4 52 46.1	−1026.2	67.10	16 8.2	59 7.3	II. S.
19	U	17 47.34	1.969	11 41 1.21	128.31	+ 1 25 58.1	1039.6	66.92	16 9.0	59 10.4	II. S.
20	L	6 10.97	1.973	12 6 41.56	128.56	− 2 2 11.1	1039.8	66.98	16 9.5	59 12.4	II. S.
20	U	18 34.75	1.992	12 32 30.27	129.71	5 29 1.6	1026.5	67.29	16 9.8	59 13.3	II. S.
21	L	6 58.85	2.026	12 58 38.26	131.76	− 8 51 50.9	− 999.4	67.82	16 9.7	59 12.9	II. S.
21	U	19 23.43	2.074	13 25 15.88	134.64	12 7 50.8	958.1	68.56	16 9.2	59 11.2	II. S.
22	L	7 48.67	2.134	13 52 32.53	138.25	15 14 6.3	901.9	69.48	16 8.4	59 8.1	II. S.
22	U	20 14.69	2.203	14 20 35.97	142.40	18 7 35.0	830.3	70.52	16 7.1	59 3.4	II. S.
23	L	8 41.57	2.277	14 49 31.56	146.88	−20 45 9.3	− 742.8	71.63	16 5.4	58 57.1	II. S.
23	U	21 9.35	2.352	15 19 21.24	151.36	23 3 41.5	640.0	72.72	16 3.1	58 48.9	II. S.
24	L	9 37.99	2.420	15 50 2.70	155.44	25 0 12.0	522.9	73.70	16 0.4	58 38.9	II. S.
24	U	22 7.37	2.474	16 21 28.73	158.71	26 32 0.6	393.5	74.47	15 57.2	58 27.1	II.N.
25	L	10 37.29	2.508	16 53 27.06	160.77	−27 37 0.8	− 255.3	74.94	15 53.5	58 13.6	II.N.
25	U	23 7.47	2.517	17 25 41.15	161.31	28 13 51.5	− 112.8	75.06	15 49.4	57 58.4	
26	L	11 37.59	2.498	17 57 51.70	160.17	28 22 7.6	+ 29.6	74.77	15 44.8	57 41.7	
27	U	0 7.33	2.453	18 29 38.93	157.44	28 2 22.8	166.7	74.10	15 39.9	57 23.7	
27	L	12 36.38	2.385	19 0 44.91	153.35	−27 16 5.0	+ 294.6	73.10	15 34.8	57 4.9	
28	U	1 4.50	2.300	19 30 55.38	148.27	26 5 25.9	409.8	71.84	15 29.5	56 45.5	I. N.
28	L	13 31.55	2.206	20 0 0.74	142.58	24 33 6.3	511.0	70.42	15 24.2	56 25.9	I. S.
29	U	1 57.43	2.108	20 27 56.26	136.67	22 42 1.0	597.3	68.93	15 18.9	56 6.5	I. S.
29	L	14 22.15	2.012	20 54 41.58	130.90	−20 35 5.8	+ 669.5	67.43	15 13.7	55 47.5	I. S.
30	U	2 45.75	1.923	21 20 19.80	125.53	18 15 8.5	727.9	66.02	15 8.8	55 29.5	I. S.
30	L	15 8.33	1.842	21 44 56.54	120.69	15 44 43.5	774.3	64.74	15 4.3	55 12.8	I. S.
31	U	3 30.01	1.773	22 8 39.14	116.54	13 6 7.9	809.9	63.60	15 0.1	54 57.7	I. S.
31	L	15 50.93	1.716	22 31 35.99	113.07	−10 21 22.2	+ 836.2	62.66	14 56.5	54 44.4	I. S.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Jan. 0	22 29	17 11 33.60	−21 36 4.4	8.0	3.0	0.22	Feb. 15	0 26	22 6 2.87	−13 42 19.1	6.4	2.4	0.17
1	22 30	17 16 44.53	21 50 26.8	7.9	3.0	0.21	16	0 29	22 13 1.78	12 59 52.7	6.5	2.4	0.17
2	22 32	17 22 4.58	22 4 17.2	7.8	2.9	0.21	17	0 32	22 20 0.18	12 16 4.9	6.5	2.5	0.17
3	22 33	17 27 32.90	22 17 30.2	7.6	2.9	0.21	18	0 35	22 26 57.84	11 30 58.2	6.5	2.5	0.17
4	22 35	17 33 8.76	22 30 1.0	7.5	2.9	0.21	19	0 38	22 33 54.49	10 44 35.7	6.6	2.5	0.17
5	22 36	17 38 51.51	−22 41 45.1	7.4	2.8	0.20	20	0 41	22 40 49.82	− 9 57 1.0	6.7	2.5	0.17
6	22 38	17 44 40.57	22 52 38.5	7.3	2.8	0.20	21	0 44	22 47 43.43	9 8 18.6	6.7	2.5	0.18
7	22 40	17 50 35.41	23 2 37.7	7.2	2.8	0.20	22	0 46	22 54 34.84	8 18 33.8	6.8	2.6	0.18
8	22 42	17 56 35.57	23 11 39.6	7.2	2.7	0.20	23	0 49	23 1 23.50	7 27 52.9	6.9	2.6	0.18
9	22 44	18 2 40.63	23 19 41.4	7.1	2.7	0.20	24	0 52	23 8 8.73	6 36 23.3	7.0	2.6	0.18
10	22 47	18 8 50.21	−23 26 40.4	7.0	2.7	0.19	25	0 55	23 14 49.75	− 5 44 13.7	7.1	2.7	0.18
11	22 49	18 15 3.95	23 32 34.2	6.9	2.6	0.19	26	0 58	23 21 25.66	4 51 34.1	7.2	2.7	0.18
12	22 51	18 21 21.55	23 37 20.8	6.9	2.6	0.19	27	1 0	23 27 55.43	3 58 35.8	7.3	2.8	0.19
13	22 54	18 27 42.71	23 40 58.3	6.8	2.6	0.19	28	1 2	23 34 17.88	3 5 31.5	7.4	2.8	0.19
14	22 56	18 34 7.17	23 43 24.9	6.8	2.6	0.19	Mar. 1	1 5	23 40 31.69	2 12 35.5	7.6	2.9	0.19
15	22 59	18 40 34.69	−23 44 39.0	6.7	2.5	0.19	2	1 7	23 46 35.43	− 1 20 3.0	7.7	2.9	0.20
16	23 1	18 47 5.05	23 44 39.2	6.7	2.5	0.18	3	1 9	23 52 27.53	− 0 28 10.9	7.9	3.0	0.20
17	23 4	18 53 38.04	23 43 24.0	6.6	2.5	0.18	4	1 10	23 58 6.30	+ 0 22 42.8	8.0	3.0	0.20
18	23 6	19 0 13.47	23 40 52.0	6.6	2.5	0.18	5	1 12	0 3 30.01	1 12 19.5	8.2	3.1	0.21
19	23 9	19 6 51.16	23 37 2.2	6.5	2.5	0.18	6	1 13	0 8 36.86	2 0 20.2	8.5	3.2	0.21
20	23 12	19 13 30.94	−23 31 53.6	6.5	2.5	0.18	7	1 14	0 13 25.05	+ 2 46 25.7	8.7	3.3	0.22
21	23 15	19 20 12.66	23 25 25.0	6.5	2.5	0.18	8	1 15	0 17 52.79	3 30 16.8	8.9	3.4	0.23
22	23 17	19 26 56.18	23 17 35.4	6.4	2.4	0.18	9	1 15	0 21 58.36	4 11 34.7	9.2	3.5	0.23
23	23 20	19 33 41.36	23 8 24.0	6.4	2.4	0.18	10	1 14	0 25 40.13	4 50 1.2	9.5	3.6	0.24
24	23 23	19 40 28.07	22 57 49.9	6.4	2.4	0.18	11	1 14	0 28 56.61	5 25 19.2	9.8	3.7	0.25
25	23 26	19 47 16.19	−22 45 52.4	6.4	2.4	0.17	12	1 13	0 31 46.52	+ 5 57 12.6	10.1	3.8	0.26
26	23 29	19 54 5.62	22 32 30.7	6.3	2.4	0.17	13	1 11	0 34 8.77	6 25 26.7	10.4	3.9	0.26
27	23 32	20 0 56.26	22 17 44.1	6.3	2.4	0.17	14	1 9	0 36 2.52	6 49 48.5	10.7	4.0	0.27
28	23 34	20 7 47.99	22 1 31.9	6.3	2.4	0.17	15	1 6	0 37 27.23	7 10 6.4	11.0	4.2	0.28
29	23 37	20 14 40.73	21 43 53.7	6.3	2.4	0.17	16	1 3	0 38 22.68	7 26 10.7	11.4	4.3	0.29
30	23 40	20 21 34.38	−21 24 48.9	6.3	2.4	0.17	17	1 0	0 38 49.00	+ 7 37 53.8	11.8	4.4	0.30
31	23 43	20 28 28.87	21 4 16.9	6.3	2.4	0.17	18	0 56	0 38 46.70	7 45 10.5	12.1	4.6	0.31
Feb. 1	23 46	20 35 24.13	20 42 17.3	6.3	2.4	0.17	19	0 52	0 38 16.74	7 47 58.7	12.4	4.7	0.32
2	23 49	20 42 20.08	20 18 49.7	6.3	2.4	0.17	20	0 47	0 37 20.48	7 46 19.2	12.8	4.8	0.33
3	23 52	20 49 16.66	19 53 53.7	6.3	2.4	0.17	21	0 42	0 35 59.72	7 40 16.4	13.1	5.0	0.34
4	23 55	20 56 13.80	−19 27 29.2	6.3	2.4	0.17	22	0 36	0 34 16.70	+ 7 29 58.6	13.4	5.1	0.34
5	23 58	21 3 11.45	18 59 36.0	6.3	2.4	0.17	23	0 30	0 32 14.07	7 15 38.4	13.7	5.2	0.35
7	0 1	21 10 9.56	18 30 13.8	6.3	2.4	0.17	24	0 24	0 29 54.86	6 57 32.7	14.0	5.3	0.36
8	0 4	21 17 8.05	17 59 22.7	6.3	2.4	0.17	25	0 17	0 27 22.39	6 36 2.5	14.2	5.4	0.36
9	0 7	21 24 6.88	17 27 2.8	6.3	2.4	0.17	26	0 10	0 24 40.19	6 11 32.8	14.4	5.5	0.37
10	0 10	21 31 5.98	−16 53 14.3	6.3	2.4	0.17	27	0 4	0 21 51.92	+ 5 44 31.8	14.6	5.5	0.37
11	0 13	21 38 5.29	16 17 57.3	6.3	2.4	0.17	27	23 57	0 19 1.25	5 15 30.3	14.7	5.6	0.37
12	0 16	21 45 4.72	15 41 12.4	6.3	2.4	0.17	28	23 50	0 16 11.77	4 45 0.9	14.8	5.6	0.38
13	0 20	21 52 4.20	15 3 0.4	6.4	2.4	0.17	29	23 44	0 13 26.86	4 13 36.7	14.9	5.6	0.38
14	0 23	21 59 3.63	14 23 22.2	6.4	2.4	0.17	30	23 37	0 10 49.66	3 41 50.1	14.9	5.6	0.38
15	0 26	22 6 2.87	−13 42 19.1	6.4	2.4	0.17	31	23 31	0 8 22.96	+ 3 10 12.2	14.9	5.6	0.38
16	0 29	22 13 1.78	−12 59 52.7	6.5	2.4	0.17	Apr. 1	23 24	0 6 9.17	+ 2 39 12.1	14.8	5.6	0.37

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Apr. 1	23 24	0 6 9.17	+ 2 39 12.1	14.8	5.6	0.37	May 16	22 51	2 30 19.66	+12 49 59.5	7.4	2.8	0.19
2	23 19	0 4 10.28	2 9 15.9	14.7	5.6	0.37	17	22 54	2 37 21.22	13 32 20.3	7.3	2.8	0.19
3	23 13	0 2 27.91	1 40 46.2	14.6	5.5	0.37	18	22 58	2 44 33.07	14 14 51.7	7.2	2.7	0.19
4	23 8	0 1 3.26	1 14 2.3	14.5	5.5	0.37	19	23 1	2 51 55.44	14 57 26.7	7.1	2.7	0.19
5	23 3	23 59 57.16	0 49 19.9	14.3	5.4	0.36	20	23 5	2 59 28.54	15 39 57.8	7.1	2.7	0.19
6	22 58	23 59 10.10	+ 0 26 51.3	14.1	5.4	0.36	21	23 8	3 7 12.54	+16 22 16.6	7.0	2.7	0.18
7	22 54	23 58 42.31	+ 0 6 45.8	13.9	5.3	0.35	22	23 12	3 15 7.53	17 4 14.3	6.9	2.6	0.18
8	22 50	23 58 33.76	− 0 10 50.2	13.7	5.2	0.35	23	23 17	3 23 13.51	17 45 40.9	6.9	2.6	0.18
9	22 46	23 58 44.20	0 25 52.7	13.5	5.1	0.34	24	23 21	3 31 30.41	18 26 25.8	6.8	2.6	0.18
10	22 42	23 59 13.24	0 38 19.7	13.3	5.0	0.34	25	23 26	3 39 58.01	19 6 17.9	6.8	2.6	0.18
11	22 39	0 0 0.38	− 0 48 11.1	13.1	5.0	0.33	26	23 30	3 48 35.99	+19 45 5.4	6.7	2.6	0.18
12	22 36	0 1 5.02	0 55 28.0	12.9	4.9	0.32	27	23 35	3 57 23.85	20 22 35.9	6.7	2.6	0.18
13	22 34	0 2 26.48	1 0 12.6	12.6	4.8	0.32	28	23 40	4 6 20.91	20 58 36.9	6.7	2.5	0.18
14	22 31	0 4 4.08	1 2 27.8	12.4	4.7	0.31	29	23 45	4 15 26.36	21 32 55.8	6.7	2.5	0.18
15	22 29	0 5 57.11	1 2 17.4	12.2	4.6	0.31	30	23 50	4 24 39.22	22 5 20.4	6.7	2.5	0.18
16	22 28	0 8 4.85	− 0 59 45.4	12.0	4.5	0.30	31	23 56	4 33 58.33	+22 35 39.1	6.7	2.5	0.18
17	22 26	0 10 26.61	0 54 56.0	11.7	4.4	0.30	June 2	0 1	4 43 22.40	23 3 41.2	6.7	2.5	0.18
18	22 24	0 13 1.70	0 47 53.8	11.5	4.4	0.29	3	0 7	4 52 50.02	23 29 17.1	6.7	2.5	0.18
19	22 23	0 15 49.50	0 38 43.3	11.3	4.3	0.29	4	0 12	5 2 19.70	23 52 18.6	6.7	2.5	0.18
20	22 22	0 18 49.39	0 27 29.3	11.1	4.2	0.28	5	0 18	5 11 49.93	24 12 39.3	6.7	2.5	0.19
21	22 22	0 22 0.81	− 0 14 16.3	10.9	4.1	0.28	6	0 23	5 21 19.18	+24 30 14.8	6.8	2.6	0.19
22	22 21	0 25 23.20	+ 0 0 51.3	10.7	4.1	0.27	7	0 29	5 30 45.94	24 45 2.2	6.8	2.6	0.19
23	22 21	0 28 56.09	0 17 49.0	10.5	4.0	0.27	8	0 34	5 40 8.77	24 57 0.5	6.8	2.6	0.19
24	22 20	0 32 39.04	0 36 32.6	10.3	3.9	0.26	9	0 40	5 49 26.33	25 6 10.4	6.9	2.6	0.19
25	22 20	0 36 31.64	0 56 57.8	10.2	3.8	0.26	10	0 45	5 58 37.38	25 12 34.4	7.0	2.6	0.19
26	22 20	0 40 33.53	+ 1 19 0.6	10.0	3.8	0.25	11	0 50	6 7 40.79	+25 16 16.1	7.0	2.7	0.20
27	22 21	0 44 44.39	1 42 37.1	9.8	3.7	0.25	12	0 55	6 16 35.59	25 17 20.1	7.1	2.7	0.20
28	22 21	0 49 3.96	2 7 43.6	9.6	3.7	0.24	13	1 0	6 25 20.93	25 15 52.3	7.2	2.7	0.20
29	22 22	0 53 32.00	2 34 16.3	9.5	3.6	0.24	14	1 4	6 33 56.10	25 11 59.1	7.3	2.8	0.20
30	22 22	0 58 8.32	3 2 11.7	9.3	3.5	0.24	15	1 9	6 42 20.46	25 5 47.4	7.4	2.8	0.20
May 1	22 23	1 2 52.76	+ 3 31 26.4	9.2	3.5	0.23	16	1 13	6 50 33.52	+24 57 24.7	7.5	2.8	0.21
2	22 24	1 7 45.23	4 1 56.9	9.0	3.4	0.23	17	1 17	6 58 34.88	24 46 58.6	7.6	2.9	0.21
3	22 25	1 12 45.63	4 33 39.8	8.9	3.4	0.22	18	1 21	7 6 24.22	24 34 36.7	7.7	2.9	0.21
4	22 26	1 17 53.93	5 6 31.9	8.7	3.3	0.22	19	1 24	7 14 1.28	24 20 26.6	7.8	2.9	0.21
5	22 28	1 23 10.12	5 40 30.0	8.6	3.3	0.22	20	1 28	7 21 25.89	24 4 36.1	7.9	3.0	0.22
6	22 29	1 28 34.24	+ 6 15 30.6	8.5	3.2	0.21	21	1 31	7 28 37.90	+23 47 12.8	8.0	3.0	0.22
7	22 31	1 34 6.33	6 51 30.5	8.3	3.2	0.21	22	1 34	7 35 37.21	23 28 24.1	8.1	3.1	0.22
8	22 32	1 39 46.51	7 28 26.4	8.2	3.1	0.21	23	1 37	7 42 23.75	23 8 17.1	8.2	3.1	0.22
9	22 34	1 45 34.90	8 6 14.9	8.1	3.1	0.21	24	1 40	7 48 57.47	22 46 59.0	8.4	3.2	0.23
10	22 36	1 51 31.66	8 44 52.4	8.0	3.0	0.20	25	1 42	7 55 18.33	22 24 36.6	8.5	3.2	0.23
11	22 38	1 57 36.97	+ 9 24 15.2	7.9	3.0	0.20	26	1 44	8 1 26.29	+22 1 16.7	8.7	3.3	0.23
12	22 41	2 3 51.03	10 4 19.1	7.8	2.9	0.20	27	1 46	8 7 21.36	21 37 5.8	8.8	3.3	0.24
13	22 43	2 10 14.08	10 45 0.1	7.7	2.9	0.20	28	1 48	8 13 3.48	21 12 10.4	9.0	3.4	0.24
14	22 46	2 16 46.36	11 26 13.8	7.6	2.9	0.19	29	1 50	8 18 32.58	20 46 36.7	9.1	3.5	0.25
15	22 48	2 23 28.13	12 7 55.4	7.5	2.8	0.19	30	1 51	8 23 48.63	20 20 30.8	9.3	3.5	0.25
16	22 51	2 30 19.66	+12 49 59.5	7.4	2.8	0.19	July 1	1 52	8 28 51.57	+19 53 58.8	9.5	3.6	0.25
17	22 54	2 37 21.22	+13 32 20.3	7.3	2.8	0.19	2	1 53	8 33 41.31	+19 27 6.7	9.6	3.6	0.26

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
July 1	1 52	8 28 51.57	+19 53 58.8	9.5	3.6	0.25
2	1 53	8 33 41.31	19 27 6.7	9.6	3.6	0.26
3	1 54	8 38 17.72	19 0 0.3	9.8	3.7	0.26
4	1 54	8 42 40.66	18 32 45.7	10.0	3.8	0.27
5	1 54	8 46 49.98	18 5 28.9	10.2	3.9	0.27
6	1 54	8 50 45.48	+17 38 15.7	10.4	3.9	0.28
7	1 54	8 54 26.92	17 11 12.0	10.5	4.0	0.28
8	1 53	8 57 54.07	16 44 23.9	10.7	4.1	0.28
9	1 53	9 1 6.63	16 17 57.6	10.9	4.1	0.29
10	1 52	9 4 4.30	15 51 59.5	11.1	4.2	0.29
11	1 50	9 6 46.75	+15 26 36.0	11.4	4.3	0.30
12	1 49	9 9 13.62	15 1 53.5	11.6	4.4	0.30
13	1 47	9 11 24.53	14 37 58.7	11.8	4.5	0.31
14	1 45	9 13 19.11	14 14 58.6	12.0	4.6	0.31
15	1 43	9 14 56.94	13 53 0.1	12.2	4.6	0.32
16	1 40	9 16 17.63	+13 32 10.3	12.4	4.7	0.32
17	1 37	9 17 20.81	13 12 36.4	12.6	4.8	0.33
18	1 34	9 18 6.14	12 54 25.9	12.9	4.9	0.33
19	1 31	9 18 33.29	12 37 46.0	13.1	5.0	0.34
20	1 27	9 18 42.02	12 22 44.0	13.3	5.0	0.34
21	1 23	9 18 32.16	+12 9 27.1	13.5	5.1	0.35
22	1 18	9 18 3.67	11 58 2.2	13.7	5.2	0.35
23	1 14	9 17 16.63	11 48 35.6	13.9	5.3	0.36
24	1 9	9 16 11.30	11 41 13.0	14.1	5.3	0.36
25	1 4	9 14 48.13	11 35 59.7	14.3	5.4	0.37
26	0 58	9 13 7.81	+11 32 59.6	14.4	5.5	0.37
27	0 52	9 11 11.29	11 32 15.5	14.6	5.5	0.38
28	0 46	9 8 59.81	11 33 48.8	14.7	5.6	0.38
29	0 40	9 6 34.90	11 37 38.9	14.8	5.6	0.38
30	0 33	9 3 58.41	11 43 43.6	14.8	5.6	0.38
31	0 26	9 1 12.51	+11 51 58.8	14.8	5.6	0.38
Aug. 1	0 20	8 58 19.66	12 2 18.2	14.8	5.6	0.38
2	0 13	8 55 22.59	12 14 33.4	14.8	5.6	0.38
3	0 6	8 52 24.24	12 28 34.0	14.7	5.6	0.38
3	23 59	8 49 27.73	12 44 8.0	14.6	5.5	0.38
4	23 52	8 46 36.31	+13 1 1.7	14.5	5.5	0.38
5	23 45	8 43 53.23	13 19 0.2	14.3	5.4	0.37
6	23 39	8 41 21.69	13 37 47.5	14.1	5.4	0.37
7	23 33	8 39 4.80	13 57 7.3	13.9	5.3	0.36
8	23 27	8 37 5.49	14 16 43.0	13.7	5.2	0.36
9	23 21	8 35 26.45	+14 36 18.0	13.4	5.1	0.35
10	23 16	8 34 10.07	14 55 35.8	13.1	5.0	0.34
11	23 11	8 33 18.44	15 14 20.4	12.8	4.8	0.34
12	23 7	8 32 53.32	15 32 16.6	12.5	4.7	0.33
13	23 3	8 32 56.13	15 49 9.5	12.2	4.6	0.32
14	23 0	8 33 27.94	+16 4 45.3	11.8	4.5	0.31
15	22 57	8 34 29.50	+16 18 50.6	11.5	4.4	0.30
Aug. 15	22 57	8 34 29.50	+16 18 50.6	11.5	4.4	0.30
16	22 54	8 36 1.23	16 31 12.6	11.2	4.2	0.29
17	22 52	8 38 3.26	16 41 39.3	10.8	4.1	0.29
18	22 51	8 40 35.43	16 49 59.2	10.5	4.0	0.28
19	22 50	8 43 37.30	16 56 1.5	10.2	3.9	0.27
20	22 50	8 47 8.14	+16 59 36.3	9.9	3.8	0.26
21	22 50	8 51 6.99	17 0 34.6	9.6	3.6	0.25
22	22 50	8 55 32.66	16 58 48.4	9.3	3.5	0.25
23	22 51	9 0 23.73	16 54 10.9	9.1	3.4	0.24
24	22 52	9 5 38.54	16 46 36.8	8.8	3.3	0.23
25	22 54	9 11 15.26	+16 36 2.4	8.6	3.3	0.23
26	22 56	9 17 11.91	16 22 25.8	8.4	3.2	0.22
27	22 58	9 23 26.38	16 5 47.2	8.2	3.1	0.21
28	23 1	9 29 56.45	15 46 8.7	8.0	3.0	0.21
29	23 4	9 36 39.89	15 23 34.3	7.8	2.9	0.20
30	23 7	9 43 34.47	+14 58 10.1	7.6	2.9	0.20
31	23 10	9 50 38.01	14 30 4.0	7.5	2.8	0.20
Sept. 1	23 13	9 57 48.45	13 59 25.1	7.3	2.8	0.19
2	23 16	10 5 3.84	13 26 23.7	7.2	2.7	0.19
3	23 20	10 12 22.41	12 51 11.2	7.1	2.7	0.19
4	23 23	10 19 42.59	+12 13 59.4	7.0	2.6	0.18
5	23 26	10 27 3.01	11 35 0.2	6.9	2.6	0.18
6	23 30	10 34 22.47	10 54 25.4	6.8	2.6	0.18
7	23 33	10 41 39.99	10 12 26.7	6.7	2.5	0.17
8	23 36	10 48 54.76	9 29 15.3	6.7	2.5	0.17
9	23 40	10 56 6.14	+ 8 45 1.6	6.6	2.5	0.17
10	23 43	11 3 13.64	7 59 55.5	6.5	2.5	0.17
11	23 46	11 10 16.90	7 14 6.2	6.5	2.4	0.17
12	23 49	11 17 15.69	6 27 42.0	6.4	2.4	0.16
13	23 52	11 24 9.85	5 40 50.6	6.4	2.4	0.16
14	23 55	11 30 59.30	+ 4 53 39.0	6.4	2.4	0.16
15	23 58	11 37 44.05	4 6 13.3	6.4	2.4	0.16
17	0 0	11 44 24.16	3 18 39.3	6.3	2.4	0.16
18	0 3	11 50 59.71	2 31 2.0	6.3	2.4	0.16
19	0 6	11 57 30.83	1 43 26.1	6.3	2.4	0.16
20	0 8	12 3 57.66	+ 0 55 55.8	6.3	2.4	0.16
21	0 10	12 10 20.39	+ 0 8 34.6	6.3	2.4	0.16
22	0 13	12 16 39.20	− 0 38 34.2	6.3	2.4	0.16
23	0 15	12 22 54.28	1 25 27.6	6.3	2.4	0.16
24	0 17	12 29 5.82	2 12 2.7	6.3	2.4	0.16
25	0 20	12 35 14.02	− 2 58 17.1	6.3	2.4	0.16
26	0 22	12 41 19.09	3 44 8.4	6.3	2.4	0.16
27	0 24	12 47 21.21	4 29 34.7	6.3	2.4	0.16
28	0 26	12 53 20.56	5 14 34.1	6.3	2.4	0.16
29	0 28	12 59 17.33	5 59 4.8	6.3	2.4	0.16
30	0 30	13 5 11.71	− 6 43 5.1	6.3	2.4	0.16
Oct. 1	0 32	13 11 3.86	− 7 26 33.4	6.3	2.4	0.16

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Oct. 1	0 32	13 11 3.86	−7 26 33.4	6.3	2.4	0.16	Nov. 16	0 42	16 22 13.26	−22 55 56.6	12.1	4.6	0.33
2	0 34	13 16 53.92	8 9 28.3	6.4	2.4	0.16	17	0 35	16 19 16.36	22 32 15.1	12.3	4.7	0.34
3	0 35	13 22 42.04	8 51 48.2	6.4	2.4	0.16	18	0 27	16 15 39.56	22 5 18.3	12.5	4.7	0.34
4	0 37	13 28 28.36	9 33 31.9	6.4	2.4	0.16	19	0 19	16 11 26.79	21 35 18.4	12.7	4.8	0.35
5	0 39	13 34 13.02	10 14 38.3	6.4	2.4	0.17	20	0 10	16 6 43.98	21 2 38.2	12.9	4.9	0.35
6	0 41	13 39 56.13	−10 55 5.8	6.5	2.5	0.17	21	0 1	16 1 39.01	−20 27 52.4	13.0	4.9	0.35
7	0 43	13 45 37.79	11 34 53.2	6.5	2.5	0.17	21	23 52	15 56 21.10	19 51 47.4	13.0	4.9	0.35
8	0 44	13 51 18.08	12 13 59.3	6.5	2.5	0.17	22	23 43	15 51 0.71	19 15 19.0	13.0	4.9	0.35
9	0 46	13 56 57.09	12 52 22.8	6.6	2.5	0.17	23	23 34	15 45 48.44	18 39 29.5	12.9	4.9	0.34
10	0 48	14 2 34.88	13 30 2.5	6.6	2.5	0.17	24	23 25	15 40 54.41	18 5 22.3	12.7	4.8	0.34
11	0 49	14 8 11.49	−14 6 57.1	6.7	2.5	0.17	25	23 16	15 36 27.54	−17 33 56.9	12.5	4.8	0.33
12	0 51	14 13 46.95	14 43 5.3	6.7	2.5	0.18	26	23 9	15 32 35.08	17 6 3.7	12.3	4.7	0.33
13	0 53	14 19 21.25	15 18 25.8	6.8	2.6	0.18	27	23 2	15 29 22.26	16 42 20.9	12.0	4.6	0.32
14	0 54	14 24 54.39	15 52 57.2	6.8	2.6	0.18	28	22 55	15 26 52.30	16 23 13.0	11.7	4.5	0.31
15	0 56	14 30 26.34	16 26 38.1	6.9	2.6	0.18	29	22 50	15 25 6.60	16 8 51.3	11.4	4.3	0.30
16	0 57	14 35 57.03	−16 59 27.2	6.9	2.6	0.18	30	22 45	15 24 5.00	−15 59 15.2	11.1	4.2	0.29
17	0 59	14 41 26.36	17 31 22.8	7.0	2.7	0.19	Dec. 1	22 40	15 23 46.17	15 54 14.2	10.8	4.1	0.28
18	1 0	14 46 54.22	18 2 23.3	7.1	2.7	0.19	2	22 37	15 24 7.89	15 53 30.7	10.5	4.0	0.28
19	1 2	14 52 20.45	18 32 27.2	7.1	2.7	0.19	3	22 34	15 25 7.42	15 56 42.7	10.2	3.9	0.27
20	1 3	14 57 44.85	19 1 32.6	7.2	2.7	0.19	4	22 32	15 26 41.74	16 3 25.5	9.9	3.8	0.26
21	1 5	15 3 7.18	−19 29 37.8	7.3	2.8	0.19	5	22 30	15 28 47.73	−16 13 13.3	9.7	3.7	0.26
22	1 6	15 8 27.16	19 56 40.8	7.4	2.8	0.20	6	22 28	15 31 22.34	16 25 40.7	9.4	3.6	0.25
23	1 8	15 13 44.45	20 22 39.7	7.5	2.8	0.20	7	22 27	15 34 22.67	16 40 23.2	9.2	3.5	0.24
24	1 9	15 18 58.65	20 47 32.2	7.6	2.9	0.20	8	22 27	15 37 45.99	16 56 57.8	9.0	3.4	0.24
25	1 10	15 24 9.30	21 11 16.1	7.7	2.9	0.21	9	22 26	15 41 29.86	17 15 3.9	8.8	3.3	0.23
26	1 11	15 29 15.86	−21 33 49.1	7.8	2.9	0.21	10	22 27	15 45 32.06	−17 34 22.3	8.6	3.2	0.23
27	1 12	15 34 17.69	21 55 8.6	7.9	3.0	0.21	11	22 27	15 49 50.60	17 54 35.7	8.4	3.2	0.22
28	1 13	15 39 14.07	22 15 11.8	8.0	3.0	0.22	12	22 28	15 54 23.71	18 15 29.0	8.2	3.1	0.22
29	1 14	15 44 4.18	22 33 55.8	8.1	3.1	0.22	13	22 28	15 59 9.85	18 36 48.6	8.1	3.1	0.21
30	1 15	15 48 47.06	22 51 17.5	8.3	3.1	0.23	14	22 29	16 4 7.65	18 58 22.5	7.9	3.0	0.21
31	1 16	15 53 21.64	−23 7 13.6	8.4	3.2	0.23	15	22 31	16 9 15.94	−19 20 0.1	7.8	2.9	0.21
Nov. 1	1 16	15 57 46.70	23 21 40.3	8.6	3.3	0.24	16	22 32	16 14 33.68	19 41 32.0	7.7	2.9	0.21
2	1 16	16 2 0.84	23 34 33.8	8.7	3.3	0.24	17	22 33	16 19 59.96	20 2 50.1	7.5	2.9	0.20
3	1 16	16 6 2.50	23 45 49.9	8.9	3.4	0.25	18	22 35	16 25 33.97	20 23 46.9	7.4	2.8	0.20
4	1 16	16 9 49.95	23 55 23.9	9.1	3.4	0.25	19	22 37	16 31 15.04	20 44 15.9	7.3	2.8	0.20
5	1 16	16 13 21.25	−24 3 10.6	9.3	3.5	0.26	20	22 39	16 37 2.56	−21 4 11.5	7.2	2.7	0.20
6	1 15	16 16 34.21	24 9 4.3	9.5	3.6	0.26	21	22 41	16 42 55.98	21 23 28.6	7.1	2.7	0.19
7	1 14	16 19 26.47	24 12 58.7	9.7	3.7	0.27	22	22 43	16 48 54.84	21 42 2.6	7.0	2.7	0.19
8	1 13	16 21 55.45	24 14 46.9	9.9	3.8	0.28	23	22 45	16 54 58.73	21 59 49.5	7.0	2.6	0.19
9	1 11	16 23 58.38	24 14 21.3	10.2	3.9	0.28	24	22 47	17 1 7.28	22 16 45.7	6.9	2.6	0.19
10	1 8	16 25 32.35	−24 11 33.1	10.4	4.0	0.29	25	22 49	17 7 20.17	−22 32 47.8	6.8	2.6	0.19
11	1 5	16 26 34.37	24 6 13.1	10.7	4.1	0.30	26	22 52	17 13 37.09	22 47 52.9	6.8	2.6	0.19
12	1 2	16 27 1.50	23 58 11.7	11.0	4.2	0.30	27	22 54	17 19 57.80	23 1 58.1	6.7	2.6	0.18
13	0 58	16 26 50.98	23 47 18.7	11.3	4.3	0.31	28	22 56	17 26 22.05	23 15 1.1	6.7	2.5	0.18
14	0 53	16 26 0.44	23 33 24.0	11.5	4.4	0.32	29	22 59	17 32 49.62	23 26 59.6	6.6	2.5	0.18
15	0 48	16 24 28.13	−23 16 18.8	11.8	4.5	0.32	30	23 1	17 39 20.32	−23 37 51.5	6.5	2.5	0.18
16	0 42	16 22 13.26	−22 55 56.6	12.1	4.6	0.33	31	23 4	17 45 53.96	−23 47 34.8	6.5	2.5	0.18

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
Jan. 0	3 2	21 41 55.42	−15 41 1.4	8.8	8.5	0.59
1	3 3	21 46 28.70	15 15 39.9	8.8	8.6	0.59
2	3 4	21 51 0.34	14 49 56.3	8.9	8.6	0.60
3	3 4	21 55 30.36	14 23 51.4	9.0	8.7	0.60
4	3 5	21 59 58.76	13 57 26.1	9.0	8.8	0.60
5	3 5	22 4 25.55	−13 30 41.1	9.1	8.8	0.60
6	3 6	22 8 50.75	13 3 37.3	9.1	8.9	0.61
7	3 6	22 13 14.37	12 36 15.4	9.2	8.9	0.61
8	3 6	22 17 36.41	12 8 36.2	9.3	9.0	0.61
9	3 7	22 21 56.90	11 40 40.7	9.3	9.1	0.62
10	3 7	22 26 15.84	−11 12 29.5	9.4	9.1	0.62
11	3 8	22 30 33.26	10 44 3.4	9.5	9.2	0.63
12	3 8	22 34 49.15	10 15 23.4	9.5	9.3	0.63
13	3 8	22 39 3.52	9 46 30.3	9.6	9.3	0.63
14	3 9	22 43 16.38	9 17 24.8	9.7	9.4	0.64
15	3 9	22 47 27.76	− 8 48 7.6	9.8	9.5	0.64
16	3 9	22 51 37.66	8 18 39.7	9.9	9.6	0.65
17	3 9	22 55 46.10	7 49 1.9	9.9	9.6	0.65
18	3 9	22 59 53.09	7 19 14.9	10.0	9.7	0.66
19	3 10	23 3 58.64	6 49 19.4	10.1	9.8	0.66
20	3 10	23 8 2.78	− 6 19 16.3	10.2	9.9	0.66
21	3 10	23 12 5.52	5 49 6.3	10.3	10.0	0.67
22	3 10	23 16 6.86	5 18 50.3	10.4	10.1	0.67
23	3 10	23 20 6.82	4 48 28.9	10.4	10.1	0.68
24	3 10	23 24 5.43	4 18 2.9	10.5	10.2	0.68
25	3 10	23 28 2.69	− 3 47 32.8	10.6	10.3	0.69
26	3 10	23 31 58.62	3 16 59.4	10.7	10.4	0.70
27	3 10	23 35 53.23	2 46 23.5	10.8	10.5	0.70
28	3 10	23 39 46.54	2 15 45.8	10.9	10.6	0.71
29	3 10	23 43 38.57	1 45 6.8	11.0	10.7	0.71
30	3 10	23 47 29.32	− 1 14 27.3	11.1	10.8	0.72
31	3 10	23 51 18.80	0 43 48.0	11.2	10.9	0.73
Feb. 1	3 10	23 55 7.00	− 0 13 9.7	11.3	11.0	0.73
2	3 9	23 58 53.92	+ 0 17 27.0	11.4	11.1	0.74
3	3 9	0 2 39.56	0 48 1.4	11.6	11.2	0.75
4	3 9	0 6 23.92	+ 1 18 32.7	11.7	11.3	0.76
5	3 9	0 10 7.00	1 49 0.2	11.8	11.4	0.76
6	3 8	0 13 48.79	2 19 23.3	11.9	11.5	0.77
7	3 8	0 17 29.28	2 49 41.2	12.0	11.7	0.78
8	3 8	0 21 8.44	3 19 53.1	12.2	11.8	0.79
9	3 8	0 24 46.26	+ 3 49 58.2	12.3	11.9	0.80
10	3 7	0 28 22.72	4 19 55.9	12.4	12.0	0.81
11	3 7	0 31 57.79	4 49 45.6	12.5	12.2	0.82
12	3 6	0 35 31.45	5 19 26.4	12.7	12.3	0.83
13	3 6	0 39 3.66	5 48 57.6	12.8	12.4	0.83
14	3 6	0 42 34.40	+ 6 18 18.4	12.9	12.6	0.84
15	3 5	0 46 3.62	+ 6 47 28.0	13.1	12.7	0.85
Feb. 15	3 5	0 46 3.62	+ 6 47 28.0	13.1	12.7	0.85
16	3 5	0 49 31.29	7 16 25.8	13.2	12.9	0.86
17	3 4	0 52 57.36	7 45 11.2	13.4	13.0	0.88
18	3 4	0 56 21.77	8 13 43.2	13.5	13.2	0.89
19	3 3	0 59 44.48	8 42 1.1	13.7	13.3	0.90
20	3 2	1 3 5.43	+ 9 10 4.4	13.9	13.5	0.91
21	3 2	1 6 24.58	9 37 52.4	14.0	13.6	0.92
22	3 1	1 9 41.86	10 5 24.4	14.2	13.8	0.94
23	3 0	1 12 57.21	10 32 39.7	14.4	14.0	0.95
24	3 0	1 16 10.57	10 59 37.6	14.6	14.1	0.96
25	2 59	1 19 21.87	+11 26 17.5	14.7	14.3	0.98
26	2 58	1 22 31.04	11 52 38.6	14.9	14.5	0.99
27	2 58	1 25 37.98	12 18 40.3	15.1	14.7	1.00
28	2 57	1 28 42.61	12 44 22.0	15.3	14.9	1.02
Mar. 1	2 56	1 31 44.84	13 9 43.0	15.5	15.1	1.03
2	2 55	1 34 44.55	+13 34 42.5	15.7	15.3	1.05
3	2 54	1 37 41.64	13 59 19.7	15.9	15.5	1.06
4	2 53	1 40 35.99	14 23 33.8	16.1	15.7	1.08
5	2 52	1 43 27.46	14 47 24.1	16.4	15.9	1.10
6	2 50	1 46 15.94	15 10 49.8	16.6	16.1	1.11
7	2 49	1 49 1.28	+15 33 50.0	16.8	16.3	1.13
8	2 48	1 51 43.30	15 56 23.8	17.1	16.6	1.15
9	2 47	1 54 21.85	16 18 30.4	17.3	16.8	1.17
10	2 45	1 56 56.75	16 40 8.9	17.6	17.1	1.18
11	2 44	1 59 27.84	17 1 18.4	17.8	17.3	1.20
12	2 42	2 1 54.93	+17 21 57.8	18.1	17.5	1.22
13	2 41	2 4 17.81	17 42 6.0	18.3	17.8	1.24
14	2 39	2 6 36.27	18 1 42.0	18.6	18.1	1.26
15	2 38	2 8 50.09	18 20 44.6	18.9	18.3	1.29
16	2 36	2 10 59.07	18 39 12.8	19.2	18.6	1.31
17	2 34	2 13 2.96	+18 57 5.3	19.4	18.9	1.33
18	2 32	2 15 1.51	19 14 20.9	19.7	19.2	1.35
19	2 30	2 16 54.48	19 30 58.3	20.1	19.5	1.38
20	2 28	2 18 41.63	19 46 56.2	20.4	19.8	1.40
21	2 26	2 20 22.71	20 2 13.1	20.7	20.1	1.42
22	2 23	2 21 57.47	+20 16 47.5	21.0	20.4	1.45
23	2 21	2 23 25.67	20 30 38.0	21.4	20.7	1.47
24	2 18	2 24 47.05	20 43 43.0	21.7	21.1	1.50
25	2 15	2 26 1.35	20 56 0.7	22.0	21.4	1.53
26	2 13	2 27 8.34	21 7 29.7	22.4	21.7	1.55
27	2 10	2 28 7.78	+21 18 8.2	22.7	22.1	1.58
28	2 7	2 28 59.41	21 27 54.2	23.1	22.4	1.61
29	2 3	2 29 43.00	21 36 45.6	23.5	22.8	1.63
30	2 0	2 30 18.33	21 44 40.3	23.9	23.2	1.66
31	1 57	2 30 45.18	21 51 36.2	24.2	23.5	1.69
Apr. 1	1 53	2 31 3.37	+21 57 31.0	24.6	23.9	1.72
2	1 49	2 31 12.71	+22 2 22.4	25.0	24.3	1.75

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Apr. 1	1 53	2 31 3.37	+21 57 31.0	24.6	23.9	1.72	May 15	22 1	1 35 24.83	+10 54 9.5	25.1	24.4	1.66
2	1 49	2 31 12.71	22 2 22.4	25.0	24.3	1.75	16	21 57	1 35 49.43	10 43 21.2	24.7	24.0	1.63
3	1 45	2 31 13.05	22 6 8.1	25.4	24.6	1.77	17	21 54	1 36 22.16	10 33 41.0	24.3	23.6	1.61
4	1 41	2 31 4.27	22 8 45.5	25.7	25.0	1.80	18	21 50	1 37 2.85	10 25 8.5	24.0	23.3	1.58
5	1 37	2 30 46.27	22 10 12.3	26.1	25.4	1.83	19	21 47	1 37 51.31	10 17 42.7	23.6	22.9	1.55
6	1 33	2 30 19.01	+22 10 26.3	26.5	25.7	1.86	20	21 44	1 38 47.32	+10 11 22.5	23.2	22.5	1.53
7	1 28	2 29 42.50	22 9 25.0	26.8	26.1	1.88	21	21 41	1 39 50.67	10 6 6.4	22.8	22.2	1.50
8	1 23	2 28 56.78	22 7 6.2	27.2	26.4	1.90	22	21 39	1 41 1.15	10 1 53.1	22.5	21.8	1.48
9	1 18	2 28 1.94	22 3 27.8	27.6	26.8	1.93	23	21 36	1 42 18.52	9 58 41.1	22.1	21.5	1.45
10	1 13	2 26 58.12	21 58 28.1	27.9	27.1	1.95	24	21 33	1 43 42.58	9 56 28.6	21.7	21.1	1.43
11	1 8	2 25 45.56	+21 52 5.7	28.2	27.4	1.97	25	21 31	1 45 13.09	+ 9 55 13.7	21.4	20.8	1.40
12	1 3	2 24 24.57	21 44 19.4	28.6	27.7	1.99	26	21 29	1 46 49.83	9 54 54.5	21.1	20.4	1.38
13	0 58	2 22 55.49	21 35 8.2	28.9	28.0	2.01	27	21 26	1 48 32.59	9 55 29.1	20.7	20.1	1.36
14	0 52	2 21 18.76	21 24 31.9	29.2	28.3	2.03	28	21 24	1 50 21.15	9 56 55.3	20.4	19.8	1.34
15	0 46	2 19 34.92	21 12 31.0	29.5	28.6	2.05	29	21 22	1 52 15.31	9 59 11.2	20.1	19.5	1.32
16	0 41	2 17 44.57	+20 59 6.4	29.7	28.9	2.06	30	21 20	1 54 14.86	+10 2 14.7	19.7	19.2	1.30
17	0 35	2 15 48.36	20 44 19.9	30.0	29.1	2.07	31	21 18	1 56 19.59	10 6 3.8	19.4	18.9	1.28
18	0 29	2 13 47.02	20 28 13.7	30.2	29.3	2.08	June 1	21 17	1 58 29.34	10 10 36.5	19.1	18.6	1.26
19	0 23	2 11 41.36	20 10 51.1	30.4	29.5	2.09	2	21 15	2 0 43.91	10 15 50.7	18.8	18.3	1.24
20	0 17	2 9 32.25	19 52 16.2	30.5	29.6	2.10	3	21 13	2 3 3.12	10 21 44.5	18.5	18.0	1.22
21	0 11	2 7 20.56	+19 32 33.8	30.6	29.7	2.10	4	21 12	2 5 26.81	+10 28 16.1	18.2	17.7	1.20
22	0 5	2 5 7.22	19 11 49.5	30.7	29.8	2.11	5	21 10	2 7 54.82	10 35 23.4	18.0	17.5	1.18
22	23 58	2 2 53.19	18 50 9.6	30.8	29.9	2.11	6	21 9	2 10 26.99	10 43 4.5	17.7	17.2	1.17
23	23 52	2 0 39.41	18 27 40.9	30.8	29.9	2.11	7	21 8	2 13 3.20	10 51 17.7	17.4	16.9	1.15
24	23 46	1 58 26.81	18 4 30.9	30.8	29.9	2.10	8	21 6	2 15 43.32	11 0 1.4	17.2	16.7	1.13
25	23 40	1 56 16.31	+17 40 47.4	30.8	29.9	2.09	9	21 5	2 18 27.21	+11 9 13.8	16.9	16.4	1.12
26	23 34	1 54 8.78	17 16 38.5	30.7	29.8	2.08	10	21 4	2 21 14.75	11 18 53.2	16.7	16.2	1.10
27	23 28	1 52 5.05	16 52 12.4	30.6	29.7	2.07	11	21 3	2 24 5.85	11 28 57.9	16.5	16.0	1.09
28	23 22	1 50 5.92	16 27 37.4	30.5	29.6	2.06	12	21 2	2 27 0.40	11 39 26.4	16.2	15.7	1.07
29	23 16	1 48 12.09	16 3 1.8	30.3	29.4	2.04	13	21 1	2 29 58.31	11 50 17.2	16.0	15.5	1.06
30	23 10	1 46 24.23	+15 38 33.5	30.1	29.2	2.03	14	21 0	2 32 59.48	+12 1 28.9	15.8	15.3	1.04
May 1	23 5	1 44 42.93	15 14 20.5	29.9	29.0	2.01	15	20 59	2 36 3.85	12 12 59.9	15.5	15.1	1.03
2	22 59	1 43 8.70	14 50 30.0	29.7	28.8	1.99	16	20 58	2 39 11.34	12 24 48.7	15.3	14.9	1.02
3	22 54	1 41 42.01	14 27 8.9	29.4	28.5	1.97	17	20 58	2 42 21.85	12 36 53.9	15.1	14.7	1.00
4	22 49	1 40 23.22	14 4 23.7	29.1	28.3	1.95	18	20 57	2 45 35.32	12 49 14.0	14.9	14.5	0.99
5	22 44	1 39 12.64	+13 42 20.3	28.8	28.0	1.92	19	20 56	2 48 51.68	+13 1 47.6	14.7	14.3	0.98
6	22 39	1 38 10.51	13 21 3.8	28.5	27.6	1.90	20	20 56	2 52 10.87	13 14 33.4	14.5	14.1	0.97
7	22 34	1 37 17.01	13 0 38.7	28.1	27.3	1.87	21	20 55	2 55 32.81	13 27 30.2	14.3	13.9	0.96
8	22 29	1 36 32.27	12 41 8.9	27.7	26.9	1.85	22	20 54	2 58 57.46	13 40 36.5	14.2	13.8	0.95
9	22 25	1 35 56.35	12 22 38.0	27.4	26.6	1.82	23	20 54	3 2 24.75	13 53 50.9	14.0	13.6	0.93
10	22 20	1 35 29.26	+12 5 8.8	27.1	26.3	1.79	24	20 54	3 5 54.62	+14 7 12.1	13.8	13.4	0.92
11	22 16	1 35 11.00	11 48 43.5	26.7	25.9	1.77	25	20 53	3 9 27.02	14 20 38.9	13.6	13.2	0.91
12	22 12	1 35 1.52	11 33 23.8	26.3	25.6	1.74	26	20 53	3 13 1.89	14 34 10.1	13.5	13.1	0.90
13	22 8	1 35 0.74	11 19 11.1	25.9	25.2	1.71	27	20 52	3 16 39.18	14 47 44.5	13.3	12.9	0.89
14	22 4	1 35 8.55	11 6 6.2	25.5	24.8	1.69	28	20 52	3 20 18.85	15 1 20.8	13.2	12.8	0.88
15	22 1	1 35 24.83	+10 54 9.5	25.1	24.4	1.66	29	20 52	3 24 0.86	+15 14 57.7	13.0	12.6	0.87
16	21 57	1 35 49.43	+10 43 21.2	24.7	24.0	1.63	30	20 52	3 27 45.14	+15 28 34.1	12.8	12.5	0.86

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
July 1	20 52	3 31 31.65	+15 42 8.9	12.7	12.3	0.86
2	20 52	3 35 20.35	15 55 41.2	12.5	12.2	0.85
3	20 51	3 39 11.20	16 9 9.7	12.4	12.0	0.84
4	20 51	3 43 4.16	16 22 33.3	12.3	11.9	0.83
5	20 51	3 46 59.19	16 35 51.0	12.1	11.8	0.82
6	20 51	3 50 56.27	+16 49 1.8	12.0	11.6	0.81
7	20 51	3 54 55.36	17 2 4.7	11.9	11.5	0.80
8	20 51	3 58 56.42	17 14 58.8	11.7	11.4	0.80
9	20 52	4 2 59.43	17 27 43.2	11.6	11.3	0.79
10	20 52	4 7 4.36	17 40 16.8	11.5	11.2	0.78
11	20 52	4 11 11.19	+17 52 38.8	11.4	11.0	0.77
12	20 52	4 15 19.89	18 4 48.3	11.3	10.9	0.77
13	20 52	4 19 30.44	18 16 44.5	11.2	10.8	0.76
14	20 52	4 23 42.82	18 28 26.3	11.0	10.7	0.75
15	20 53	4 27 57.00	18 39 52.9	10.9	10.6	0.75
16	20 53	4 32 12.96	+18 51 3.6	10.8	10.5	0.74
17	20 53	4 36 30.67	19 1 57.4	10.7	10.4	0.74
18	20 54	4 40 50.09	19 12 33.5	10.6	10.3	0.73
19	20 54	4 45 11.20	19 22 51.1	10.5	10.2	0.72
20	20 55	4 49 33.98	19 32 49.3	10.4	10.1	0.72
21	20 55	4 53 58.38	+19 42 27.4	10.3	10.0	0.71
22	20 56	4 58 24.37	19 51 44.5	10.2	9.9	0.70
23	20 56	5 2 51.93	20 0 40.0	10.1	9.8	0.70
24	20 57	5 7 21.01	20 9 13.0	10.0	9.8	0.69
25	20 57	5 11 51.58	20 17 22.8	10.0	9.7	0.69
26	20 58	5 16 23.60	+20 25 8.7	9.9	9.6	0.68
27	20 58	5 20 57.02	20 32 30.2	9.8	9.5	0.68
28	20 59	5 25 31.79	20 39 26.5	9.7	9.4	0.67
29	21 0	5 30 7.87	20 45 56.9	9.6	9.3	0.67
30	21 0	5 34 45.24	20 52 0.8	9.5	9.3	0.66
31	21 1	5 39 23.84	+20 57 37.6	9.5	9.2	0.66
Aug. 1	21 2	5 44 3.62	21 2 46.7	9.4	9.2	0.65
2	21 2	5 48 44.54	21 7 27.6	9.3	9.1	0.65
3	21 3	5 53 26.54	21 11 39.9	9.2	9.0	0.64
4	21 4	5 58 9.57	21 15 23.0	9.2	8.9	0.64
5	21 5	6 2 53.59	+21 18 36.4	9.1	8.8	0.63
6	21 6	6 7 38.55	21 21 19.8	9.0	8.8	0.63
7	21 6	6 12 24.42	21 23 32.6	9.0	8.7	0.62
8	21 7	6 17 11.14	21 25 14.5	8.9	8.6	0.62
9	21 8	6 21 58.69	21 26 25.2	8.8	8.6	0.61
10	21 9	6 26 47.01	+21 27 4.3	8.8	8.5	0.61
11	21 10	6 31 36.05	21 27 11.4	8.7	8.5	0.61
12	21 11	6 36 25.76	21 26 46.1	8.6	8.4	0.60
13	21 12	6 41 16.12	21 25 48.3	8.6	8.3	0.60
14	21 13	6 46 7.07	21 24 17.7	8.5	8.3	0.59
15	21 14	6 50 58.56	+21 22 14.1	8.5	8.2	0.59
16	21 14	6 55 50.54	+21 19 37.2	8.4	8.2	0.59
Aug. 16	21 14	6 55 50.54	+21 19 37.2	8.4	8.2	0.59
17	21 15	7 0 42.96	21 16 26.9	8.3	8.1	0.58
18	21 16	7 5 35.80	21 12 42.9	8.3	8.0	0.58
19	21 17	7 10 28.97	21 8 25.1	8.2	8.0	0.57
20	21 18	7 15 22.44	21 3 33.4	8.2	7.9	0.57
21	21 19	7 20 16.18	+20 58 7.8	8.1	7.9	0.56
22	21 20	7 25 10.13	20 52 8.2	8.1	7.8	0.56
23	21 21	7 30 4.23	20 45 34.6	8.0	7.8	0.56
24	21 22	7 34 58.44	20 38 27.0	8.0	7.7	0.55
25	21 23	7 39 52.71	20 30 45.3	7.9	7.7	0.55
26	21 24	7 44 47.00	+20 22 29.7	7.9	7.6	0.55
27	21 25	7 49 41.26	20 13 40.4	7.8	7.6	0.54
28	21 26	7 54 35.43	20 4 17.5	7.8	7.6	0.54
29	21 27	7 59 29.48	19 54 21.0	7.7	7.5	0.53
30	21 28	8 4 23.37	19 43 51.1	7.7	7.5	0.53
31	21 29	8 9 17.05	+19 32 48.1	7.6	7.4	0.53
Sept. 1	21 30	8 14 10.49	19 21 12.3	7.6	7.4	0.52
2	21 30	8 19 3.64	19 9 3.9	7.5	7.3	0.52
3	21 31	8 23 56.46	18 56 23.0	7.5	7.3	0.51
4	21 32	8 28 48.93	18 43 10.1	7.5	7.2	0.51
5	21 33	8 33 41.02	+18 29 25.5	7.4	7.2	0.50
6	21 34	8 38 32.71	18 15 9.5	7.4	7.2	0.50
7	21 35	8 43 23.97	18 0 22.4	7.3	7.1	0.50
8	21 36	8 48 14.78	17 45 4.6	7.3	7.1	0.49
9	21 37	8 53 5.11	17 29 16.3	7.3	7.0	0.49
10	21 38	8 57 54.96	+17 12 58.1	7.2	7.0	0.49
11	21 39	9 2 44.31	16 56 10.4	7.2	7.0	0.49
12	21 40	9 7 33.14	16 38 53.6	7.2	6.9	0.48
13	21 40	9 12 21.43	16 21 8.0	7.1	6.9	0.48
14	21 41	9 17 9.16	16 2 54.1	7.1	6.9	0.48
15	21 42	9 21 56.34	+15 44 12.4	7.1	6.8	0.47
16	21 43	9 26 42.97	15 25 3.4	7.0	6.8	0.47
17	21 44	9 31 29.02	15 5 27.6	7.0	6.8	0.47
18	21 45	9 36 14.50	14 45 25.5	7.0	6.7	0.46
19	21 45	9 40 59.41	14 24 57.6	6.9	6.7	0.46
20	21 46	9 45 43.74	+14 4 4.4	6.9	6.7	0.46
21	21 47	9 50 27.48	13 42 46.5	6.9	6.6	0.46
22	21 48	9 55 10.63	13 21 4.5	6.8	6.6	0.45
23	21 48	9 59 53.21	12 58 59.0	6.8	6.6	0.45
24	21 49	10 4 35.21	12 36 30.5	6.8	6.6	0.45
25	21 50	10 9 16.65	+12 13 39.5	6.7	6.5	0.45
26	21 51	10 13 57.52	11 50 26.9	6.7	6.5	0.44
27	21 52	10 18 37.83	11 26 53.3	6.7	6.5	0.44
28	21 52	10 23 17.58	11 2 59.3	6.6	6.5	0.44
29	21 53	10 27 56.79	10 38 45.5	6.6	6.4	0.44
30	21 54	10 32 35.47	+10 14 12.5	6.6	6.4	0.43
Oct. 1	21 54	10 37 13.63	+ 9 49 21.0	6.6	6.4	0.43

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
Oct. 1	21 54	10 37 13.63	+ 9 49 21.0	6.6	6.4	0.43
2	21 55	10 41 51.29	9 24 11.8	6.5	6.3	0.43
3	21 56	10 46 28.47	8 58 45.4	6.5	6.3	0.43
4	21 56	10 51 5.18	8 33 2.5	6.5	6.3	0.42
5	21 57	10 55 41.44	8 7 3.8	6.5	6.3	0.42
6	21 58	11 0 17.29	+ 7 40 50.0	6.4	6.2	0.42
7	21 58	11 4 52.75	7 14 21.6	6.4	6.2	0.42
8	21 59	11 9 27.84	6 47 39.4	6.4	6.2	0.42
9	22 0	11 14 2.58	6 20 44.0	6.4	6.2	0.41
10	22 0	11 18 37.01	5 53 36.0	6.3	6.1	0.41
11	22 1	11 23 11.16	+ 5 26 16.2	6.3	6.1	0.41
12	22 2	11 27 45.06	4 58 45.4	6.3	6.1	0.41
13	22 2	11 32 18.73	4 31 3.9	6.3	6.1	0.41
14	22 3	11 36 52.21	4 3 12.5	6.2	6.1	0.41
15	22 3	11 41 25.54	3 35 12.0	6.2	6.0	0.40
16	22 4	11 45 58.74	+ 3 7 3.2	6.2	6.0	0.40
17	22 4	11 50 31.85	2 38 46.6	6.2	6.0	0.40
18	22 5	11 55 4.90	2 10 23.0	6.2	6.0	0.40
19	22 6	11 59 37.92	1 41 53.0	6.1	5.9	0.40
20	22 6	12 4 10.96	1 13 17.4	6.1	5.9	0.40
21	22 7	12 8 44.04	+ 0 44 36.8	6.1	5.9	0.40
22	22 8	12 13 17.20	+ 0 15 52.2	6.1	5.9	0.39
23	22 8	12 17 50.47	− 0 12 55.8	6.1	5.9	0.39
24	22 9	12 22 23.89	0 41 46.7	6.0	5.9	0.39
25	22 9	12 26 57.49	1 10 39.5	6.0	5.8	0.39
26	22 10	12 31 31.30	− 1 39 33.5	6.0	5.8	0.39
27	22 11	12 36 5.35	2 8 27.9	6.0	5.8	0.39
28	22 11	12 40 39.68	2 37 22.0	6.0	5.8	0.39
29	22 12	12 45 14.33	3 6 14.9	5.9	5.8	0.39
30	22 13	12 49 49.33	3 35 5.9	5.9	5.8	0.38
31	22 13	12 54 24.71	− 4 3 54.2	5.9	5.7	0.38
Nov. 1	22 14	12 59 0.51	4 32 39.1	5.9	5.7	0.38
2	22 14	13 3 36.76	5 1 19.9	5.9	5.7	0.38
3	22 15	13 8 13.51	5 29 55.9	5.9	5.7	0.38
4	22 16	13 12 50.79	5 58 26.2	5.8	5.7	0.38
5	22 17	13 17 28.63	− 6 26 50.0	5.8	5.6	0.38
6	22 17	13 22 7.07	6 55 6.6	5.8	5.6	0.38
7	22 18	13 26 46.14	7 23 15.3	5.8	5.6	0.38
8	22 19	13 31 25.88	7 51 15.4	5.8	5.6	0.38
9	22 19	13 36 6.34	8 19 5.9	5.8	5.6	0.38
10	22 20	13 40 47.54	− 8 46 46.1	5.7	5.6	0.38
11	22 21	13 45 29.52	9 14 15.3	5.7	5.6	0.38
12	22 22	13 50 12.31	9 41 32.7	5.7	5.5	0.38
13	22 22	13 54 55.94	10 8 37.6	5.7	5.5	0.38
14	22 23	13 59 40.44	10 35 29.1	5.7	5.5	0.38
15	22 24	14 4 25.86	−11 2 6.5	5.7	5.5	0.37
16	22 25	14 9 12.23	−11 28 29.1	5.7	5.5	0.37
Nov. 16	22 25	14 9 12.23	−11 28 29.1	5.7	5.5	0.37
17	22 26	14 13 59.57	11 54 35.9	5.7	5.5	0.37
18	22 27	14 18 47.91	12 20 26.1	5.6	5.5	0.37
19	22 28	14 23 37.28	12 45 59.0	5.6	5.5	0.37
20	22 28	14 28 27.69	13 11 13.9	5.6	5.5	0.37
21	22 29	14 33 19.18	−13 36 9.7	5.6	5.4	0.37
22	22 30	14 38 11.76	14 0 45.7	5.6	5.4	0.37
23	22 31	14 43 5.45	14 25 1.1	5.6	5.4	0.37
24	22 32	14 48 0.27	14 48 55.1	5.6	5.4	0.37
25	22 33	14 52 56.23	15 12 26.9	5.6	5.4	0.37
26	22 34	14 57 53.34	−15 35 35.6	5.5	5.4	0.37
27	22 35	15 2 51.63	15 58 20.4	5.5	5.4	0.37
28	22 36	15 7 51.09	16 20 40.6	5.5	5.4	0.37
29	22 37	15 12 51.73	16 42 35.3	5.5	5.3	0.37
30	22 38	15 17 53.56	17 4 3.7	5.5	5.3	0.37
Dec. 1	22 39	15 22 56.58	−17 25 5.0	5.5	5.3	0.37
2	22 40	15 28 0.79	17 45 38.4	5.5	5.3	0.37
3	22 42	15 33 6.19	18 5 43.1	5.5	5.3	0.37
4	22 43	15 38 12.79	18 25 18.4	5.5	5.3	0.37
5	22 44	15 43 20.59	18 44 23.6	5.5	5.3	0.37
6	22 45	15 48 29.57	−19 2 58.0	5.4	5.3	0.37
7	22 46	15 53 39.72	19 21 0.9	5.4	5.3	0.37
8	22 48	15 58 51.04	19 38 31.4	5.4	5.3	0.37
9	22 49	16 4 3.50	19 55 28.9	5.4	5.2	0.37
10	22 50	16 9 17.11	20 11 52.7	5.4	5.2	0.37
11	22 52	16 14 31.83	−20 27 42.1	5.4	5.2	0.37
12	22 53	16 19 47.66	20 42 56.5	5.4	5.2	0.37
13	22 54	16 25 4.57	20 57 35.2	5.4	5.2	0.37
14	22 56	16 30 22.54	21 11 37.6	5.4	5.2	0.37
15	22 57	16 35 41.53	21 25 2.9	5.4	5.2	0.37
16	22 58	16 41 1.51	−21 37 50.7	5.4	5.2	0.37
17	23 0	16 46 22.46	21 50 0.3	5.3	5.2	0.37
18	23 1	16 51 44.35	22 1 31.3	5.3	5.2	0.37
19	23 3	16 57 7.12	22 12 23.0	5.3	5.2	0.37
20	23 4	17 2 30.73	22 22 35.0	5.3	5.2	0.37
21	23 6	17 7 55.15	−22 32 6.8	5.3	5.2	0.37
22	23 7	17 13 20.32	22 40 57.9	5.3	5.2	0.37
23	23 8	17 18 46.18	22 49 7.7	5.3	5.2	0.37
24	23 10	17 24 12.69	22 56 35.9	5.3	5.1	0.37
25	23 12	17 29 39.80	23 3 22.2	5.3	5.1	0.37
26	23 13	17 35 7.45	−23 9 26.2	5.3	5.1	0.37
27	23 14	17 40 35.57	23 14 47.7	5.3	5.1	0.37
28	23 16	17 46 4.10	23 19 26.3	5.3	5.1	0.37
29	23 18	17 51 32.97	23 23 21.8	5.3	5.1	0.37
30	23 19	17 57 2.14	23 26 34.0	5.3	5.1	0.37
31	23 21	18 2 31.54	−23 29 2.6	5.3	5.1	0.37
32	23 22	18 8 1.11	−23 30 47.6	5.3	5.1	0.37

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Oct. 1	17 56	6 38 6.57	+23 29 55.0	7.9	4.6	0.33	Nov. 16	16 2	7 44 50.58	+23 11 50.5	11.1	6.4	0.46
2	17 54	6 40 12.91	23 29 30.5	8.0	4.6	0.33	17	15 58	7 45 22.57	23 13 11.6	11.2	6.4	0.46
3	17 52	6 42 17.94	23 29 2.1	8.0	4.6	0.33	18	15 55	7 45 51.48	23 14 41.5	11.2	6.5	0.47
4	17 50	6 44 21.66	23 28 30.0	8.1	4.6	0.34	19	15 51	7 46 17.25	23 16 20.4	11.3	6.5	0.47
5	17 48	6 46 24.03	23 27 54.4	8.1	4.7	0.34	20	15 48	7 46 39.82	23 18 8.4	11.4	6.6	0.48
6	17 46	6 48 25.02	+23 27 15.6	8.2	4.7	0.34	21	15 44	7 46 59.14	+23 20 5.9	11.5	6.6	0.48
7	17 45	6 50 24.63	23 26 33.9	8.2	4.7	0.34	22	15 40	7 47 15.15	23 22 12.9	11.6	6.7	0.48
8	17 43	6 52 22.85	23 25 49.6	8.3	4.8	0.34	23	15 37	7 47 27.80	23 24 29.5	11.7	6.7	0.49
9	17 41	6 54 19.64	23 25 2.8	8.3	4.8	0.34	24	15 33	7 47 37.05	23 26 56.0	11.8	6.8	0.49
10	17 39	6 56 14.97	23 24 13.9	8.4	4.8	0.34	25	15 29	7 47 42.84	23 29 32.2	11.9	6.8	0.49
11	17 37	6 58 8.81	+23 23 23.0	8.5	4.9	0.35	26	15 25	7 47 45.13	+23 32 18.2	12.0	6.9	0.50
12	17 34	7 0 1.13	23 22 30.4	8.5	4.9	0.35	27	15 21	7 47 43.90	23 35 14.1	12.1	6.9	0.50
13	17 32	7 1 51.91	23 21 36.4	8.6	4.9	0.35	28	15 17	7 47 39.11	23 38 19.7	12.2	7.0	0.51
14	17 30	7 3 41.11	23 20 41.2	8.6	4.9	0.36	29	15 13	7 47 30.74	23 41 35.2	12.3	7.0	0.51
15	17 28	7 5 28.72	23 19 45.1	8.7	5.0	0.36	30	15 9	7 47 18.76	23 45 0.3	12.4	7.1	0.51
16	17 26	7 7 14.70	+23 18 48.4	8.7	5.0	0.36	Dec. 1	15 5	7 47 3.15	+23 48 34.9	12.4	7.1	0.52
17	17 24	7 8 59.00	23 17 51.4	8.8	5.0	0.37	2	15 0	7 46 43.89	23 52 18.8	12.5	7.2	0.52
18	17 22	7 10 41.60	23 16 54.3	8.8	5.1	0.37	3	14 56	7 46 20.98	23 56 11.8	12.6	7.2	0.52
19	17 19	7 12 22.46	23 15 57.6	8.9	5.1	0.37	4	14 52	7 45 54.42	24 0 13.7	12.7	7.3	0.53
20	17 17	7 14 1.54	23 15 1.4	8.9	5.1	0.37	5	14 48	7 45 24.20	24 4 24.2	12.8	7.3	0.53
21	17 15	7 15 38.81	+23 14 6.0	9.0	5.2	0.37	6	14 43	7 44 50.31	+24 8 42.9	12.9	7.4	0.54
22	17 12	7 17 14.22	23 13 11.7	9.1	5.2	0.37	7	14 38	7 44 12.77	24 13 9.5	13.0	7.4	0.54
23	17 10	7 18 47.71	23 12 18.9	9.1	5.2	0.37	8	14 34	7 43 31.58	24 17 43.7	13.0	7.5	0.55
24	17 8	7 20 19.25	23 11 27.8	9.2	5.3	0.38	9	14 29	7 42 46.78	24 22 25.0	13.1	7.5	0.55
25	17 5	7 21 48.79	23 10 38.8	9.3	5.3	0.38	10	14 24	7 41 58.38	24 27 12.9	13.2	7.6	0.55
26	17 3	7 23 16.30	+23 9 52.4	9.3	5.4	0.38	11	14 20	7 41 6.43	+24 32 7.0	13.3	7.6	0.56
27	17 0	7 24 41.74	23 9 8 7	9.4	5.4	0.38	12	14 15	7 40 10.95	24 37 6.7	13.4	7.7	0.56
28	16 58	7 26 5.06	23 8 28.0	9.5	5.4	0.39	13	14 10	7 39 11.97	24 42 11.4	13.4	7.7	0.56
29	16 55	7 27 26.21	23 7 50.7	9.5	5.5	0.39	14	14 5	7 38 9.56	24 47 20.7	13.5	7.7	0.57
30	16 52	7 28 45.16	23 7 17.0	9.6	5.5	0.39	15	14 0	7 37 3.78	24 52 33.9	13.6	7.8	0.57
31	16 50	7 30 1.87	+23 6 47.4	9.7	5.6	0.39	16	13 55	7 35 54.69	+24 57 50.3	13.6	7.8	0.57
Nov. 1	16 47	7 31 16.30	23 6 22.1	9.8	5.6	0.40	17	13 50	7 34 42.35	25 3 9.3	13.7	7.8	0.57
2	16 44	7 32 28.41	23 6 1.3	9.9	5.7	0.41	18	13 44	7 33 26.86	25 8 30.1	13.8	7.9	0.57
3	16 42	7 33 38.17	23 5 45.5	10.0	5.7	0.41	19	13 39	7 32 8.32	25 13 52.1	13.8	7.9	0.57
4	16 39	7 34 45.53	23 5 34.8	10.1	5.8	0.42	20	13 34	7 30 46.85	25 19 14.4	13.9	7.9	0.58
5	16 36	7 35 50.45	+23 5 29.6	10.1	5.8	0.42	21	13 29	7 29 22.55	+25 24 36.2	13.9	8.0	0.58
6	16 33	7 36 52.88	23 5 30.1	10.2	5.9	0.42	22	13 23	7 27 55.56	25 29 56.9	13.9	8.0	0.58
7	16 30	7 37 52.79	23 5 36.7	10.3	5.9	0.43	23	13 18	7 26 26.03	25 35 15.6	14.0	8.0	0.58
8	16 27	7 38 50.13	23 5 49.6	10.4	6.0	0.43	24	13 12	7 24 54.11	25 40 31.5	14.0	8.0	0.59
9	16 24	7 39 44.85	23 6 9.1	10.5	6.0	0.43	25	13 7	7 23 19.97	25 45 43.7	14.0	8.0	0.59
10	16 21	7 40 36.90	+23 6 35.4	10.6	6.1	0.44	26	13 1	7 21 43.80	+25 50 51.5	14.1	8.1	0.59
11	16 18	7 41 26.25	23 7 8.8	10.6	6.1	0.44	27	12 56	7 20 5.79	25 55 54.1	14.1	8.1	0.59
12	16 15	7 42 12.85	23 7 49.5	10.7	6.2	0.44	28	12 50	7 18 26.14	26 0 50.7	14.1	8.1	0.60
13	16 11	7 42 56.63	23 8 37.7	10.8	6.2	0.45	29	12 45	7 16 45.06	26 5 40.4	14.1	8.1	0.60
14	16 8	7 43 37 55	23 9 33.8	10.9	6.3	0.45	30	12 39	7 15 2.76	26 10 22.6	14.1	8.1	0.60
15	16 5	7 44 15.55	+23 10 38.0	11.0	6.3	0.45	31	12 33	7 13 19.45	+26 14 56.7	14.1	8.1	0.60
16	16 2	7 44 50.58	+23 11 50.5	11.1	6.4	0.46	32	12 28	7 11 35.34	+26 19 22.1	14.1	8.1	0.60

Stellar magnitude at opposition, in January, 1914, −1.3.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
Apr. 1	18 29	19 10 0.69	−22 22 33.1	1.7	18.0	1.38
2	18 26	19 10 25.73	22 21 56.8	1.7	18.0	1.39
3	18 22	19 10 50.09	22 21 21.4	1.7	18.1	1.39
4	18 19	19 11 13.75	22 20 47.0	1.7	18.2	1.40
5	18 15	19 11 36.71	22 20 13.7	1.7	18.2	1.40
6	18 12	19 11 58.97	−22 19 41.4	1.7	18.3	1.41
7	18 8	19 12 20.52	22 19 10.1	1.7	18.4	1.41
8	18 4	19 12 41.36	22 18 39.9	1.7	18.5	1.42
9	18 1	19 13 1.47	22 18 10.9	1.7	18.5	1.43
10	17 57	19 13 20.85	22 17 43.0	1.7	18.6	1.43
11	17 54	19 13 39.51	−22 17 16.3	1.7	18.6	1.44
12	17 50	19 13 57.45	22 16 50.8	1.8	18.7	1.44
13	17 46	19 14 14.64	22 16 26.6	1.8	18.7	1.44
14	17 43	19 14 31.08	22 16 3.6	1.8	18.8	1.45
15	17 39	19 14 46.77	22 15 41.9	1.8	18.8	1.45
16	17 35	19 15 1.71	−22 15 21.5	1.8	18.9	1.45
17	17 32	19 15 15.89	22 15 2.3	1.8	18.9	1.46
18	17 28	19 15 29.31	22 14 44.5	1.8	19.0	1.47
19	17 24	19 15 41.98	22 14 28.1	1.8	19.0	1.47
20	17 20	19 15 53.88	22 14 13.1	1.8	19.1	1.48
21	17 17	19 16 5.01	−22 13 59.5	1.8	19.2	1.48
22	17 13	19 16 15.36	22 13 47.2	1.8	19.2	1.48
23	17 9	19 16 24.93	22 13 36.2	1.8	19.3	1.49
24	17 5	19 16 33.73	22 13 26.7	1.8	19.4	1.49
25	17 2	19 16 41.76	22 13 18.7	1.8	19.5	1.49
26	16 58	19 16 49.00	−22 13 12.2	1.8	19.5	1.50
27	16 54	19 16 55.44	22 13 7.1	1.8	19.6	1.50
28	16 50	19 17 1.07	22 13 3.5	1.8	19.7	1.51
29	16 46	19 17 5.89	22 13 1.4	1.9	19.7	1.51
30	16 42	19 17 9.91	22 13 0.9	1.9	19.8	1.52
May 1	16 38	19 17 13.13	−22 13 1.8	1.9	19.8	1.52
2	16 34	19 17 15.55	22 13 4.3	1.9	19.9	1.53
3	16 31	19 17 17.15	22 13 8.5	1.9	19.9	1.53
4	16 27	19 17 17.95	22 13 14.2	1.9	20.0	1.54
5	16 23	19 17 17.94	22 13 21.4	1.9	20.1	1.54
6	16 19	19 17 17.12	−22 13 30.2	1.9	20.1	1.55
7	16 15	19 17 15.49	22 13 40.5	1.9	20.2	1.55
8	16 11	19 17 13.05	22 13 52.3	1.9	20.3	1.56
9	16 7	19 17 9.79	22 14 5.5	1.9	20.3	1.56
10	16 3	19 17 5.73	22 14 20.3	1.9	20.4	1.57
11	15 59	19 17 0.88	−22 14 36.7	1.9	20.5	1.58
12	15 55	19 16 55.23	22 14 54.6	1.9	20.5	1.58
13	15 51	19 16 48.79	22 15 14.0	1.9	20.6	1.59
14	15 47	19 16 41.55	22 15 34.9	1.9	20.7	1.59
15	15 43	19 16 33.53	22 15 57.2	1.9	20.7	1.60
16	15 39	19 16 24.73	−22 16 20.9	1.9	20.8	1.60
17	15 34	19 16 15.15	−22 16 46.1	1.9	20.9	1.61

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
May 16	15 39	19 16 24.73	−22 16 20.9	1.9	20.8	1.60
17	15 34	19 16 15.15	22 16 46.1	1.9	20.9	1.61
18	15 30	19 16 4.79	22 17 12.7	1.9	20.9	1.61
19	15 26	19 15 53.67	22 17 40.7	2.0	21.0	1.61
20	15 22	19 15 41.79	22 18 10.0	2.0	21.0	1.62
21	15 18	19 15 29.14	−22 18 40.7	2.0	21.1	1.62
22	15 14	19 15 15.74	22 19 12.8	2.0	21.2	1.62
23	15 10	19 15 1.60	22 19 46.1	2.0	21.2	1.63
24	15 6	19 14 46.71	22 20 20.7	2.0	21.3	1.63
25	15 2	19 14 31.08	22 20 56.6	2.0	21.3	1.64
26	14 57	19 14 14.72	−22 21 33.7	2.0	21.3	1.64
27	14 53	19 13 57.64	22 22 12.0	2.0	21.4	1.64
28	14 49	19 13 39.84	22 22 51.5	2.0	21.4	1.65
29	14 44	19 13 21.34	22 23 32.2	2.0	21.5	1.65
30	14 40	19 13 2.15	22 24 14.0	2.0	21.6	1.66
31	14 36	19 12 42.28	−22 24 56.8	2.0	21.6	1.66
June 1	14 32	19 12 21.75	22 25 40.6	2.0	21.6	1.66
2	14 27	19 12 0.55	22 26 25.4	2.0	21.7	1.67
3	14 23	19 11 38.70	22 27 11.2	2.0	21.7	1.67
4	14 19	19 11 16.21	22 27 57.9	2.0	21.8	1.67
5	14 14	19 10 53.10	−22 28 45.6	2.0	21.8	1.68
6	14 10	19 10 29.38	22 29 34.1	2.0	21.9	1.68
7	14 6	19 10 5.08	22 30 23.4	2.0	22.0	1.68
8	14 1	19 9 40.21	22 31 13.4	2.0	22.0	1.69
9	13 57	19 9 14.78	22 32 4.1	2.0	22.0	1.70
10	13 53	19 8 48.81	−22 32 55.4	2.1	22.1	1.70
11	13 48	19 8 22.32	22 33 47.4	2.1	22.1	1.70
12	13 44	19 7 55.33	22 34 39.9	2.1	22.1	1.71
13	13 40	19 7 27.86	22 35 32.9	2.1	22.1	1.71
14	13 35	19 6 59.92	22 36 26.3	2.1	22.2	1.71
15	13 31	19 6 31.53	−22 37 20.2	2.1	22.2	1.71
16	13 26	19 6 2.70	22 38 14.5	2.1	22.2	1.72
17	13 22	19 5 33.45	22 39 9.2	2.1	22.2	1.72
18	13 18	19 5 3.81	22 40 4.2	2.1	22.3	1.72
19	13 13	19 4 33.79	22 40 59.3	2.1	22.3	1.72
20	13 9	19 4 3.42	−22 41 54.6	2.1	22.3	1.73
21	13 4	19 3 32.70	22 42 50.0	2.1	22.3	1.73
22	13 0	19 3 1.66	22 43 45.5	2.1	22.3	1.73
23	12 55	19 2 30.33	22 44 41.1	2.1	22.3	1.73
24	12 51	19 1 58.72	22 45 36.7	2.1	22.4	1.73
25	12 46	19 1 26.85	−22 46 32.4	2.1	22.4	1.73
26	12 42	19 0 54.74	22 47 28.0	2.1	22.4	1.73
27	12 38	19 0 22.40	22 48 23.5	2.1	22.5	1.73
28	12 33	18 59 49.87	22 49 18.8	2.1	22.5	1.73
29	12 29	18 59 17.18	22 50 13.8	2.1	22.5	1.73
30	12 24	18 58 44.35	−22 51 8.6	2.1	22.5	1.74
July 1	12 20	18 58 11.40	−22 52 3.2	2.1	22.5	1.74

Stellar magnitude at opposition, in July, 1913. −2.2.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
July 1	12 20	18 58 11.40	−22 52 3.2	2.1	22.5	1.74	Aug. 16	8 58	18 37 15.97	−23 21 45.8	2.0	21.4	1.64
2	12 15	18 57 38.35	22 52 57.5	2.1	22.5	1.74	17	8 54	18 37 1.44	23 22 5.0	2.0	21.3	1.64
3	12 11	18 57 5.23	22 53 51.4	2.1	22.5	1.74	18	8 50	18 36 47.66	23 22 23.4	2.0	21.3	1.64
4	12 6	18 56 32.07	22 54 44.9	2.1	22.5	1.74	19	8 45	18 36 34.64	23 22 40.9	2.0	21.2	1.63
5	12 2	18 55 58.88	22 55 38.0	2.1	22.5	1.74	20	8 41	18 36 22.39	23 22 57.7	2.0	21.2	1.63
6	11 57	18 55 25.70	−22 56 30.5	2.1	22.5	1.74	21	8 37	18 36 10.93	−23 23 13.8	2.0	21.1	1.63
7	11 53	18 54 52.54	22 57 22.6	2.1	22.5	1.74	22	8 33	18 36 0.25	23 23 29.1	2.0	21.1	1.63
8	11 48	18 54 19.44	22 58 14.2	2.1	22.5	1.74	23	8 29	18 35 50.37	23 23 43.6	2.0	21.0	1.62
9	11 44	18 53 46.42	22 59 5.3	2.1	22.5	1.74	24	8 25	18 35 41.28	23 23 57.3	2.0	21.0	1.62
10	11 39	18 53 13.51	22 59 55.8	2.1	22.5	1.74	25	8 21	18 35 32.99	23 24 10.2	2.0	20.9	1.62
11	11 35	18 52 40.72	−23 0 45.7	2.1	22.5	1.74	26	8 17	18 35 25.51	−23 24 22.3	1.9	20.8	1.61
12	11 30	18 52 8.07	23 1 35.0	2.1	22.5	1.74	27	8 13	18 35 18.84	23 24 33.7	1.9	20.8	1.60
13	11 26	18 51 35.60	23 2 23.5	2.1	22.5	1.74	28	8 9	18 35 12.99	23 24 44.3	1.9	20.7	1.60
14	11 21	18 51 3.32	23 3 11.3	2.1	22.5	1.74	29	8 5	18 35 7.96	23 24 54.1	1.9	20.7	1.59
15	11 17	18 50 31.24	23 3 58.4	2.1	22.5	1.74	30	8 1	18 35 3.76	23 25 3.2	1.9	20.6	1.59
16	11 12	18 49 59.40	−23 4 44.8	2.1	22.5	1.74	31	7 57	18 35 0.39	−23 25 11.6	1.9	20.6	1.58
17	11 8	18 49 27.81	23 5 30.4	2.1	22.4	1.74	Sept. 1	7 53	18 34 57.84	23 25 19.2	1.9	20.5	1.58
18	11 4	18 48 56.51	23 6 15.2	2.1	22.4	1.73	2	7 49	18 34 56.11	23 25 26.0	1.9	20.5	1.57
19	10 59	18 48 25.52	23 6 59.2	2.1	22.4	1.73	3	7 45	18 34 55.22	23 25 32.1	1.9	20.4	1.57
20	10 55	18 47 54.84	23 7 42.4	2.1	22.4	1.73	4	7 41	18 34 55.17	23 25 37.4	1.9	20.4	1.57
21	10 50	18 47 24.49	−23 8 24.7	2.1	22.4	1.73	5	7 37	18 34 55.96	−23 25 41.9	1.9	20.3	1.56
22	10 46	18 46 54.49	23 9 6.3	2.1	22.4	1.73	6	7 33	18 34 57.58	23 25 45.7	1.9	20.2	1.56
23	10 41	18 46 24.88	23 9 47.2	2.1	22.4	1.72	7	7 29	18 35 0.04	23 25 48.8	1.9	20.1	1.56
24	10 37	18 45 55.67	23 10 27.2	2.1	22.3	1.72	8	7 25	18 35 3.32	23 25 51.1	1.9	20.1	1.55
25	10 32	18 45 26.88	23 11 6.3	2.1	22.3	1.72	9	7 21	18 35 7.42	23 25 52.7	1.9	20.0	1.55
26	10 28	18 44 58.53	−23 11 44.5	2.1	22.3	1.72	10	7 18	18 35 12.34	−23 25 53.5	1.9	19.9	1.54
27	10 24	18 44 30.64	23 12 21.9	2.1	22.2	1.71	11	7 14	18 35 18.09	23 25 53.6	1.9	19.9	1.54
28	10 19	18 44 3.23	23 12 58.4	2.1	22.2	1.71	12	7 10	18 35 24.65	23 25 53.0	1.9	19.8	1.54
29	10 15	18 43 36.32	23 13 34.0	2.1	22.2	1.71	13	7 6	18 35 32.03	23 25 51.6	1.9	19.7	1.53
30	10 11	18 43 9.92	23 14 8.8	2.1	22.2	1.71	14	7 2	18 35 40.23	23 25 49.4	1.8	19.7	1.53
31	10 6	18 42 44.06	−23 14 42.7	2.1	22.1	1.71	15	6 58	18 35 49.23	−23 25 46.5	1.8	19.6	1.52
Aug. 1	10 2	18 42 18.75	23 15 15.7	2.1	22.1	1.70	16	6 55	18 35 59.03	23 25 42.8	1.8	19.6	1.52
2	9 58	18 41 54.01	23 15 47.8	2.0	22.1	1.70	17	6 51	18 36 9.63	23 25 38.3	1.8	19.5	1.51
3	9 53	18 41 29.87	23 16 19.1	2.0	22.1	1.70	18	6 47	18 36 21.03	23 25 33.0	1.8	19.5	1.51
4	9 49	18 41 6.34	23 16 49.5	2.0	22.0	1.69	19	6 44	18 36 33.23	23 25 27.0	1.8	19.4	1.50
5	9 45	18 40 43.42	−23 17 19.1	2.0	21.9	1.69	20	6 40	18 36 46.22	−23 25 20.2	1.8	19.3	1.50
6	9 40	18 40 21.13	23 17 47.7	2.0	21.9	1.69	21	6 36	18 36 59.99	23 25 12.5	1.8	19.3	1.49
7	9 36	18 39 59.50	23 18 15.4	2.0	21.8	1.69	22	6 32	18 37 14.55	23 25 4.1	1.8	19.2	1.49
8	9 32	18 39 38.53	23 18 42.3	2.0	21.7	1.68	23	6 29	18 37 29.90	23 24 54.9	1.8	19.1	1.48
9	9 27	18 39 18.24	23 19 8.3	2.0	21.7	1.68	24	6 25	18 37 46.02	23 24 44.9	1.8	19.1	1.48
10	9 23	18 38 58.64	−23 19 33.4	2.0	21.7	1.68	25	6 21	18 38 2.92	−23 24 34.0	1.8	19.0	1.47
11	9 19	18 38 39.73	23 19 57.6	2.0	21.6	1.67	26	6 18	18 38 20.58	23 24 22.2	1.8	19.0	1.47
12	9 15	18 38 21.53	23 20 20.9	2.0	21.6	1.67	27	6 14	18 38 39.00	23 24 9.6	1.8	18.9	1.47
13	9 10	18 38 4.04	23 20 43.4	2.0	21.5	1.66	28	6 10	18 38 58.18	23 23 56.1	1.8	18.8	1.46
14	9 6	18 37 47.28	23 21 5.0	2.0	21.5	1.66	29	6 7	18 39 18.11	23 23 41.7	1.8	18.8	1.46
15	9 2	18 37 31.25	−23 21 25.8	2.0	21.4	1.65	30	6 3	18 39 38.79	−23 23 26.5	1.8	18.7	1.45
16	8 58	18 37 15.97	−23 21 45.8	2.0	21.4	1.64	Oct. 1	6 0	18 40 0.22	−23 23 10.4	1.7	18.7	1.45

Stellar magnitude at opposition, in July, 1913, −2.2.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
Jan. 0	9 4	3 44 23.76	+17 38 25.2	1.1	9.3	0.71
1	9 0	3 44 11.69	17 38 0.6	1.1	9.3	0.71
2	8 56	3 44 0.00	17 37 37.3	1.1	9.3	0.71
3	8 52	3 43 48.70	17 37 15.4	1.1	9.3	0.71
4	8 47	3 43 37.78	17 36 54.8	1.1	9.3	0.71
5	8 43	3 43 27.26	+17 36 35.7	1.1	9.2	0.71
6	8 39	3 43 17.14	17 36 18.0	1.0	9.2	0.71
7	8 35	3 43 7.44	17 36 1.8	1.0	9.2	0.71
8	8 31	3 42 58.16	17 35 47.1	1.0	9.2	0.71
9	8 27	3 42 49.30	17 35 33.8	1.0	9.2	0.70
10	8 23	3 42 40.86	+17 35 22.1	1.0	9.2	0.70
11	8 19	3 42 32.86	17 35 11.9	1.0	9.2	0.70
12	8 15	3 42 25.28	17 35 3.3	1.0	9.2	0.70
13	8 11	3 42 18.13	17 34 56.2	1.0	9.1	0.70
14	8 7	3 42 11.42	17 34 50.6	1.0	9.1	0.70
15	8 3	3 42 5.16	+17 34 46.5	1.0	9.1	0.70
16	7 59	3 41 59.34	17 34 43.9	1.0	9.1	0.70
17	7 54	3 41 53.96	17 34 42.8	1.0	9.1	0.70
18	7 50	3 41 49.03	17 34 43.3	1.0	9.1	0.69
19	7 46	3 41 44.55	17 34 45.4	1.0	9.1	0.69
20	7 42	3 41 40.53	+17 34 49.1	1.0	9.0	0.69
21	7 38	3 41 36.96	17 34 54.3	1.0	9.0	0.69
22	7 35	3 41 33.83	17 35 0.9	1.0	9.0	0.69
23	7 31	3 41 31.16	17 35 9.1	1.0	9.0	0.69
24	7 27	3 41 28.95	17 35 18.9	1.0	9.0	0.69
25	7 23	3 41 27.21	+17 35 30.3	1.0	8.9	0.69
26	7 19	3 41 25.92	17 35 43.3	1.0	8.9	0.68
27	7 15	3 41 25.08	17 35 57.8	1.0	8.9	0.68
28	7 11	3 41 24.70	17 36 13.9	1.0	8.9	0.68
29	7 7	3 41 24.78	17 36 31.5	1.0	8.9	0.68
30	7 3	3 41 25.33	+17 36 50.7	1.0	8.9	0.68
31	6 59	3 41 26.34	17 37 11.5	1.0	8.9	0.68
Feb. 1	6 55	3 41 27.80	17 37 33.8	1.0	8.8	0.68
2	6 51	3 41 29.73	17 37 57.6	1.0	8.8	0.68
3	5 47	3 41 32.13	17 38 22.9	1.0	8.8	0.68
4	6 44	3 41 34.99	+17 38 49.8	1.0	8.8	0.67
5	6 40	3 41 38.32	17 39 18.2	1.0	8.8	0.67
6	6 36	3 41 42.10	17 39 48.0	1.0	8.8	0.67
7	6 32	3 41 46.34	17 40 19.3	1.0	8.8	0.67
8	6 28	3 41 51.04	17 40 52.2	1.0	8.7	0.67
9	6 24	3 41 56.20	+17 41 26.6	1.0	8.7	0.67
10	6 20	3 42 1.81	17 42 2.5	1.0	8.7	0.67
11	6 16	3 42 7.87	17 42 39.8	1.0	8.7	0.67
12	6 13	3 42 14.39	17 43 18.5	1.0	8.7	0.66
13	6 9	3 42 21.37	17 43 58.6	1.0	8.7	0.66
14	6 5	3 42 28.80	+17 44 40.1	1.0	8.6	0.66
15	6 1	3 42 36.66	+17 45 23.0	1.0	8.6	0.66
Feb. 15	6 1	3 42 36.66	+17 45 23.0	1.0	8.6	0.66
16	5 57	3 42 44.96	17 46 7.2	1.0	8.6	0.66
17	5 54	3 42 53.70	17 46 52.8	1.0	8.6	0.66
18	5 50	3 43 2.87	17 47 39.7	1.0	8.6	0.66
19	5 46	3 43 12.48	17 48 28.0	1.0	8.6	0.66
20	5 42	3 43 22.51	+17 49 17.5	1.0	8.5	0.66
21	5 39	3 43 32.97	17 50 8.3	1.0	8.5	0.65
22	5 35	3 43 43.86	17 51 0.4	1.0	8.5	0.65
23	5 31	3 43 55.17	17 51 53.7	1.0	8.5	0.65
24	5 27	3 44 6.90	17 52 48.3	1.0	8.5	0.65
25	5 24	3 44 19.05	+17 53 44.1	1.0	8.5	0.65
26	5 20	3 44 31.60	17 54 41.1	1.0	8.5	0.65
27	5 16	3 44 44.56	17 55 39.3	1.0	8.4	0.65
28	5 12	3 44 57.94	17 56 38.6	1.0	8.4	0.65
Mar. 1	5 9	3 45 11.72	+17 57 39.1	1.0	8.4	0.64
Sept. 1	18 22	5 6 4.55	+21 13 13.0	1.0	8.5	0.66
2	18 18	5 6 17.23	21 13 23.1	1.0	8.5	0.67
3	18 15	5 6 29.49	21 13 32.6	1.0	8.5	0.67
4	18 11	5 6 41.33	21 13 41.5	1.0	8.5	0.67
5	18 7	5 6 52.74	21 13 49.8	1.0	8.5	0.67
6	18 3	5 7 3.73	+21 13 57.5	1.0	8.5	0.67
7	18 0	5 7 14.29	21 14 4.5	1.0	8.6	0.67
8	17 56	5 7 24.41	21 14 10.9	1.0	8.6	0.67
9	17 52	5 7 34.09	21 14 16.7	1.0	8.6	0.67
10	17 48	5 7 43.33	21 14 21.8	1.0	8.6	0.67
11	17 44	5 7 52.14	+21 14 26.3	1.0	8.6	0.68
12	17 41	5 8 0.50	21 14 30.2	1.0	8.6	0.68
13	17 37	5 8 8.42	21 14 33.6	1.0	8.7	0.68
14	17 33	5 8 15.89	21 14 36.4	1.0	8.7	0.68
15	17 29	5 8 22.92	21 14 38.5	1.0	8.7	0.68
16	17 26	5 8 29.49	+21 14 40.0	1.0	8.7	0.68
17	17 22	5 8 35.61	21 14 41.0	1.0	8.7	0.68
18	17 18	5 8 41.27	21 14 41.4	1.0	8.7	0.68
19	17 14	5 8 46.48	21 14 41.2	1.0	8.8	0.69
20	17 10	5 8 51.23	21 14 40.5	1.0	8.8	0.69
21	17 6	5 8 55.52	+21 14 39.2	1.0	8.8	0.69
22	17 2	5 8 59.34	21 14 37.3	1.0	8.8	0.69
23	16 58	5 9 2.70	21 14 34.8	1.0	8.8	0.69
24	16 55	5 9 5.58	21 14 31.7	1.0	8.8	0.69
25	16 51	5 9 7.99	21 14 28.1	1.0	8.8	0.69
26	16 47	5 9 9.94	+21 14 23.9	1.0	8.9	0.70
27	16 43	5 9 11.41	21 14 19.2	1.0	8.9	0.70
28	16 39	5 9 12.40	21 14 14.0	1.0	8.9	0.70
29	16 35	5 9 12.92	21 14 8.2	1.0	8.9	0.70
30	16 31	5 9 12.97	21 14 1.8	1.0	8.9	0.70
Oct 1	16 27	5 9 12.55	+21 13 54.9	1.0	8.9	0.70
2	16 23	5 9 11.65	+21 13 47.4	1.0	9.0	0.70

Stellar magnitude at opposition, in December, 1913, −0.2.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
Oct. 1	16 27	5 9 12.55	+21 13 54.9	1.0	8.9	0.70
2	16 23	5 9 11.65	21 13 47.4	1.0	9.0	0.70
3	16 19	5 9 10.28	21 13 39.5	1.0	9.0	0.71
4	16 15	5 9 8.45	21 13 31.1	1.0	9.0	0.71
5	16 11	5 9 6.14	21 13 22.1	1.0	9.0	0.71
6	16 7	5 9 3.36	+21 13 12.6	1.0	9.0	0.71
7	16 3	5 9 0.12	21 13 2.7	1.0	9.0	0.71
8	15 59	5 8 56.41	21 12 52.3	1.0	9.1	0.71
9	15 55	5 8 52.23	21 12 41.3	1.0	9.1	0.71
10	15 51	5 8 47.60	21 12 29.8	1.0	9.1	0.71
11	15 47	5 8 42.52	+21 12 17.9	1.0	9.1	0.71
12	15 43	5 8 36.98	21 12 5.5	1.0	9.1	0.71
13	15 39	5 8 30.98	21 11 52.6	1.0	9.1	0.72
14	15 35	5 8 24.53	21 11 39.2	1.0	9.2	0.72
15	15 31	5 8 17.63	21 11 25.3	1.0	9.2	0.72
16	15 27	5 8 10.28	+21 11 10.9	1.0	9.2	0.72
17	15 23	5 8 2.49	21 10 56.0	1.0	9.2	0.72
18	15 19	5 7 54.26	21 10 40.7	1.0	9.2	0.72
19	15 15	5 7 45.59	21 10 24.9	1.0	9.2	0.72
20	15 11	5 7 36.49	21 10 8.7	1.0	9.2	0.72
21	15 7	5 7 26.95	+21 9 52.0	1.1	9.3	0.73
22	15 3	5 7 16.99	21 9 34.9	1.1	9.3	0.73
23	14 59	5 7 6.61	21 9 17.3	1.1	9.3	0.73
24	14 54	5 6 55.81	21 8 59.3	1.1	9.3	0.73
25	14 50	5 6 44.59	21 8 40.9	1.1	9.3	0.73
26	14 46	5 6 32.96	+21 8 22.1	1.1	9.3	0.73
27	14 42	5 6 20.92	21 8 2.8	1.1	9.3	0.73
28	14 38	5 6 8.49	21 7 43.0	1.1	9.3	0.73
29	14 34	5 5 55.67	21 7 22.9	1.1	9.4	0.73
30	14 30	5 5 42.46	21 7 2.4	1.1	9.4	0.73
31	14 26	5 5 28.88	+21 6 41.5	1.1	9.4	0.73
Nov. 1	14 21	5 5 14.93	21 6 20.2	1.1	9.4	0.74
2	14 17	5 5 0.61	21 5 58.6	1.1	9.4	0.74
3	14 13	5 4 45.95	21 5 36.5	1.1	9.4	0.74
4	14 9	5 4 30.94	21 5 14.1	1.1	9.4	0.74
5	14 5	5 4 15.58	+21 4 51.4	1.1	9.4	0.74
6	14 0	5 3 59.89	21 4 28.2	1.1	9.4	0.74
7	13 56	5 3 43.89	21 4 4.7	1.1	9.5	0.74
8	13 52	5 3 27.58	21 3 40.9	1.1	9.5	0.74
9	13 48	5 3 10.96	21 3 16.8	1.1	9.5	0.74
10	13 44	5 2 54.05	+21 2 52.4	1.1	9.5	0.74
11	13 39	5 2 36.85	21 2 27.7	1.1	9.5	0.74
12	13 35	5 2 19.37	21 2 2.7	1.1	9.5	0.74
13	13 31	5 2 1.62	21 1 37.4	1.1	9.5	0.75
14	13 27	5 1 43.60	21 1 11.8	1.1	9.5	0.75
15	13 22	5 1 25.34	+21 0 46.0	1.1	9.5	0.75
16	13 18	5 1 6.84	+21 0 19.9	1.1	9.5	0.75
Nov. 16	13 18	5 1 6.84	+21 0 19.9	1.1	9.5	0.75
17	13 14	5 0 48.10	20 59 53.5	1.1	9.5	0.75
18	13 10	5 0 29.13	20 59 26.9	1.1	9.6	0.75
19	13 6	5 0 9.95	20 59 0.1	1.1	9.6	0.75
20	13 1	4 59 50.58	20 58 33.1	1.1	9.6	0.75
21	12 57	4 59 31.02	+20 58 5.8	1.1	9.6	0.75
22	12 53	4 59 11.27	20 57 38.3	1.1	9.6	0.75
23	12 49	4 58 51.36	20 57 10.7	1.1	9.6	0.75
24	12 44	4 58 31.29	20 56 43.0	1.1	9.6	0.75
25	12 40	4 58 11.07	20 56 15.2	1.1	9.6	0.75
26	12 36	4 57 50.71	+20 55 47.2	1.1	9.6	0.75
27	12 31	4 57 30.23	20 55 19.1	1.1	9.6	0.75
28	12 27	4 57 9.64	20 54 51.0	1.1	9.6	0.75
29	12 23	4 56 48.95	20 54 22.8	1.1	9.6	0.75
30	12 19	4 56 28.17	20 53 54.5	1.1	9.6	0.75
Dec. 1	12 14	4 56 7.33	+20 53 26.2	1.1	9.6	0.75
2	12 10	4 55 46.43	20 52 57.9	1.1	9.6	0.75
3	12 6	4 55 25.47	20 52 29.7	1.1	9.6	0.75
4	12 1	4 55 4.47	20 52 1.5	1.1	9.6	0.75
5	11 57	4 54 43.46	20 51 33.2	1.1	9.6	0.75
6	11 53	4 54 22.44	+20 51 5.0	1.1	9.6	0.75
7	11 49	4 54 1.42	20 50 36.8	1.1	9.6	0.75
8	11 44	4 53 40.41	20 50 8.8	1.1	9.6	0.75
9	11 40	4 53 19.43	20 49 40.9	1.1	9.6	0.75
10	11 36	4 52 58.48	20 49 13.1	1.1	9.6	0.75
11	11 32	4 52 37.58	+20 48 45.5	1.1	9.6	0.75
12	11 27	4 52 16.73	20 48 18.1	1.1	9.6	0.75
13	11 23	4 51 55.96	20 47 50.8	1.1	9.6	0.75
14	11 19	4 51 35.27	20 47 23.7	1.1	9.6	0.75
15	11 14	4 51 14.67	20 46 56.8	1.1	9.6	0.75
16	11 10	4 50 54.18	+20 46 30.2	1.1	9.6	0.75
17	11 6	4 50 33.81	20 46 3.9	1.1	9.6	0.75
18	11 2	4 50 13.56	20 45 37.8	1.1	9.6	0.75
19	10 57	4 49 53.44	20 45 12.0	1.1	9.6	0.75
20	10 53	4 49 33.47	20 44 46.6	1.1	9.6	0.75
21	10 49	4 49 13.67	+20 44 21.5	1.1	9.6	0.75
22	10 44	4 48 54.04	20 43 56.7	1.1	9.6	0.75
23	10 40	4 48 34.60	20 43 32.3	1.1	9.6	0.75
24	10 36	4 48 15.35	20 43 8.3	1.1	9.6	0.75
25	10 32	4 47 56.31	20 42 44.8	1.1	9.6	0.75
26	10 28	4 47 37.49	+20 42 21.7	1.1	9.6	0.75
27	10 23	4 47 18.90	20 41 59.1	1.1	9.5	0.75
28	10 19	4 47 0.55	20 41 37.0	1.1	9.5	0.74
29	10 15	4 46 42.45	20 41 15.4	1.1	9.5	0.74
30	10 11	4 46 24.62	20 40 54.4	1.1	9.5	0.74
31	10 6	4 46 7.06	+20 40 33.9	1.1	9.5	0.74
32	10 2	4 45 49.78	+20 40 14.1	1.1	9.5	0.74

Stellar magnitude at opposition, in December, 1913, —0.2.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
May 1	18 1	20 40 18.57	−18 59 17.6	0.4	1.7	0.12
2	17 57	20 40 20.59	18 59 12.3	0.4	1.7	0.12
3	17 54	20 40 22.40	18 59 7.7	0.4	1.7	0.12
4	17 50	20 40 24.01	18 59 3.9	0.4	1.7	0.12
5	17 46	20 40 25.41	18 59 0.8	0.4	1.7	0.12
6	17 42	20 40 26.61	−18 58 58.5	0.4	1.7	0.12
7	17 38	20 40 27.61	18 58 57.0	0.4	1.7	0.12
8	17 34	20 40 28.41	18 58 56.3	0.4	1.7	0.12
9	17 30	20 40 29.00	18 58 56.3	0.4	1.7	0.12
10	17 26	20 40 29.39	18 58 57.1	0.4	1.7	0.12
11	17 22	20 40 29.58	−18 58 58.6	0.5	1.7	0.12
12	17 18	20 40 29.57	18 59 0.9	0.5	1.7	0.12
13	17 14	20 40 29.35	18 59 3.9	0.5	1.7	0.12
14	17 10	20 40 28.93	18 59 7.7	0.5	1.7	0.12
15	17 6	20 40 28.31	18 59 12.2	0.5	1.7	0.12
16	17 2	20 40 27.51	−18 59 17.5	0.5	1.7	0.12
17	16 58	20 40 26.51	18 59 23.5	0.5	1.7	0.12
18	16 54	20 40 25.30	18 59 30.2	0.5	1.7	0.12
19	16 51	20 40 23.90	18 59 37.7	0.5	1.7	0.12
20	16 47	20 40 22.30	18 59 45.9	0.5	1.7	0.12
21	16 43	20 40 20.51	−18 59 54.8	0.5	1.7	0.12
22	16 39	20 40 18.53	19 0 4.4	0.5	1.7	0.12
23	16 35	20 40 16.35	19 0 14.7	0.5	1.7	0.12
24	16 31	20 40 13.97	19 0 25.8	0.5	1.7	0.12
25	16 27	20 40 11.40	19 0 37.6	0.5	1.7	0.12
26	16 23	20 40 8.65	−19 0 50.1	0.5	1.7	0.12
27	16 19	20 40 5.71	19 1 3.3	0.5	1.7	0.12
28	16 15	20 40 2.58	19 1 17.1	0.5	1.7	0.12
29	16 11	20 39 59.26	19 1 31.6	0.5	1.7	0.12
30	16 7	20 39 55.76	19 1 46.8	0.5	1.7	0.12
31	16 3	20 39 52.07	−19 2 2.7	0.5	1.7	0.12
June 1	15 59	20 39 48.20	19 2 19.2	0.5	1.7	0.12
2	15 55	20 39 44.16	19 2 36.3	0.5	1.7	0.12
3	15 51	20 39 39.93	19 2 54.2	0.5	1.7	0.12
4	15 47	20 39 35.52	19 3 12.7	0.5	1.7	0.12
5	15 43	20 39 30.94	−19 3 31.8	0.5	1.7	0.12
6	15 39	20 39 26.18	19 3 51.5	0.5	1.7	0.12
7	15 35	20 39 21.25	19 4 11.9	0.5	1.7	0.12
8	15 31	20 39 16.15	19 4 32.9	0.5	1.7	0.12
9	15 27	20 39 10.89	19 4 54.5	0.5	1.7	0.12
10	15 23	20 39 5.46	−19 5 16.6	0.5	1.7	0.12
11	15 19	20 38 59.87	19 5 39.3	0.5	1.7	0.12
12	15 15	20 38 54.12	19 6 2.6	0.5	1.7	0.12
13	15 11	20 38 48.21	19 6 26.5	0.5	1.7	0.12
14	15 7	20 38 42.15	19 6 50.8	0.5	1.7	0.12
15	15 3	20 38 35.93	−19 7 15.7	0.5	1.7	0.12
16	14 59	20 38 29.56	−19 7 41.1	0.5	1.7	0.12
June 16	14 59	20 38 29.56	−19 7 41.1	0.5	1.7	0.12
17	14 55	20 38 23.05	19 8 7.0	0.5	1.7	0.12
18	14 50	20 38 16.40	19 8 33.4	0.5	1.7	0.12
19	14 46	20 38 9.60	19 9 0.3	0.5	1.7	0.12
20	14 42	20 38 2.66	19 9 27.7	0.5	1.7	0.12
21	14 38	20 37 55.59	−19 9 55.5	0.5	1.7	0.12
22	14 34	20 37 48.39	19 10 23.8	0.5	1.7	0.12
23	14 30	20 37 41.04	19 10 52.6	0.5	1.7	0.12
24	14 26	20 37 33.56	19 11 21.7	0.5	1.7	0.12
25	14 22	20 37 25.96	19 11 51.3	0.5	1.7	0.12
26	14 18	20 37 18.24	−19 12 21.3	0.5	1.7	0.12
27	14 14	20 37 10.39	19 12 51.7	0.5	1.7	0.12
28	14 10	20 37 2.43	19 13 22.4	0.5	1.7	0.12
29	14 6	20 36 54.36	19 13 53.6	0.5	1.7	0.12
30	14 2	20 36 46.17	19 14 25.2	0.5	1.7	0.12
July 1	13 58	20 36 37.88	−19 14 57.1	0.5	1.8	0.13
2	13 54	20 36 29.48	19 15 29.2	0.5	1.8	0.13
3	13 50	20 36 20.98	19 16 1.7	0.5	1.8	0.13
4	13 46	20 36 12.38	19 16 34.5	0.5	1.8	0.13
5	13 42	20 36 3.68	19 17 7.6	0.5	1.8	0.13
6	13 37	20 35 54.89	−19 17 41.0	0.5	1.8	0.13
7	13 33	20 35 46.01	19 18 14.6	0.5	1.8	0.13
8	13 29	20 35 37.05	19 18 48.4	0.5	1.8	0.13
9	13 25	20 35 28.02	19 19 22.5	0.5	1.8	0.13
10	13 21	20 35 18.91	19 19 56.7	0.5	1.8	0.13
11	13 17	20 35 9.73	−19 20 31.2	0.5	1.8	0.13
12	13 13	20 35 0.48	19 21 5.8	0.5	1.8	0.13
13	13 9	20 34 51.18	19 21 40.6	0.5	1.8	0.13
14	13 5	20 34 41.81	19 22 15.5	0.5	1.8	0.13
15	13 1	20 34 32.38	19 22 50.6	0.5	1.8	0.13
16	12 56	20 34 22.89	−19 23 25.9	0.5	1.8	0.13
17	12 52	20 34 13.36	19 24 1.3	0.5	1.8	0.13
18	12 48	20 34 3.79	19 24 36.8	0.5	1.8	0.13
19	12 44	20 33 54.17	19 25 12.3	0.5	1.8	0.13
20	12 40	20 33 44.51	19 25 47.8	0.5	1.8	0.13
21	12 36	20 33 34.82	−19 26 23.4	0.5	1.8	0.13
22	12 32	20 33 25.09	19 26 59.1	0.5	1.8	0.13
23	12 28	20 33 15.33	19 27 34.8	0.5	1.8	0.13
24	12 24	20 33 5.55	19 28 10.5	0.5	1.8	0.13
25	12 20	20 32 55.76	19 28 46.2	0.5	1.8	0.13
26	12 16	20 32 45.95	−19 29 21.9	0.5	1.8	0.13
27	12 12	20 32 36.13	19 29 57.6	0.5	1.8	0.13
28	12 7	20 32 26.29	19 30 33.2	0.5	1.8	0.13
29	12 3	20 32 16.45	19 31 8.7	0.5	1.8	0.13
30	11 59	20 32 6.61	19 31 44.1	0.5	1.8	0.13
31	11 55	20 31 56.78	−19 32 19.5	0.5	1.8	0.13
Aug. 1	11 51	20 31 46.96	−19 32 54.9	0.5	1.8	0.13

Stellar magnitude at opposition, in July, 1913, 6.0.

URANUS, 1913.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Aug. 1	11 51	20 31 46.96	−19 32 54.9	0.5	1.8	0.13	Sept. 16	8 44	20 25 32.50	−19 54 18.2	0.5	1.7	0.12
2	11 47	20 31 37.16	19 33 30.1	0.5	1.8	0.13	17	8 40	20 25 27.33	19 54 34.6	0.5	1.7	0.12
3	11 43	20 31 27.37	19 34 5.1	0.5	1.8	0.13	18	8 36	20 25 22.34	19 54 50.4	0.5	1.7	0.12
4	11 39	20 31 17.61	19 34 40.0	0.5	1.8	0.13	19	8 32	20 25 17.52	19 55 5.6	0.5	1.7	0.12
5	11 35	20 31 7.87	19 35 14.7	0.5	1.8	0.13	20	8 28	20 25 12.88	19 55 20.1	0.5	1.7	0.12
6	11 30	20 30 58.16	−19 35 49.3	0.5	1.8	0.13	21	8 24	20 25 8.41	−19 55 34.1	0.5	1.7	0.12
7	11 26	20 30 48.49	19 36 23.6	0.5	1.8	0.13	22	8 20	20 25 4.13	19 55 47.4	0.5	1.7	0.12
8	11 22	20 30 38.86	19 36 57.7	0.5	1.8	0.13	23	8 16	20 25 0.03	19 56 0.0	0.5	1.7	0.12
9	11 18	20 30 29.27	19 37 31.5	0.5	1.8	0.13	24	8 12	20 24 56.12	19 56 12.0	0.5	1.7	0.12
10	11 14	20 30 19.73	19 38 5.2	0.5	1.8	0.13	25	8 8	20 24 52.39	19 56 23.3	0.5	1.7	0.12
11	11 10	20 30 10.24	−19 38 38.6	0.5	1.8	0.13	26	8 4	20 24 48.85	−19 56 33.9	0.5	1.7	0.12
12	11 6	20 30 0.80	19 39 11.8	0.5	1.8	0.13	27	8 0	20 24 45.50	19 56 43.8	0.5	1.7	0.12
13	11 2	20 29 51.41	19 39 44.7	0.5	1.8	0.13	28	7 56	20 24 42.35	19 56 53.1	0.5	1.7	0.12
14	10 58	20 29 42.09	19 40 17.3	0.5	1.8	0.13	29	7 52	20 24 39.39	19 57 1.7	0.5	1.7	0.12
15	10 54	20 29 32.84	19 40 49.6	0.5	1.8	0.13	30	7 48	20 24 36.63	19 57 9.6	0.5	1.7	0.12
16	10 50	20 29 23.66	−19 41 21.6	0.5	1.8	0.13	Oct. 1	7 44	20 24 34.07	−19 57 16.8	0.5	1.7	0.12
17	10 46	20 29 14.55	19 41 53.3	0.5	1.8	0.13	2	7 40	20 24 31.70	19 57 23.3	0.5	1.7	0.12
18	10 42	20 29 5.51	19 42 24.6	0.5	1.8	0.13	3	7 36	20 24 29.53	19 57 29.1	0.5	1.7	0.12
19	10 37	20 28 56.55	19 42 55.5	0.5	1.8	0.13	4	7 32	20 24 27.57	19 57 34.3	0.5	1.7	0.12
20	10 33	20 28 47.69	19 43 26.1	0.5	1.8	0.13	5	7 28	20 24 25.82	19 57 38.8	0.5	1.7	0.12
21	10 29	20 28 38.91	−19 43 56.3	0.5	1.8	0.13	6	7 24	20 24 24.27	−19 57 42.5	0.5	1.7	0.12
22	10 25	20 28 30.21	19 44 26.1	0.5	1.8	0.13	7	7 20	20 24 22.91	19 57 45.5	0.5	1.7	0.12
23	10 21	20 28 21.61	19 44 55.6	0.5	1.8	0.13	8	7 16	20 24 21.75	19 57 47.9	0.5	1.7	0.12
24	10 17	20 28 13.10	19 45 24.7	0.5	1.8	0.13	9	7 12	20 24 20.80	19 57 49.5	0.5	1.7	0.12
25	10 13	20 28 4.69	19 45 53.4	0.5	1.8	0.13	10	7 8	20 24 20.06	19 57 50.4	0.5	1.7	0.12
26	10 9	20 27 56.39	−19 46 21.7	0.5	1.8	0.13	11	7 4	20 24 19.53	−19 57 50.6	0.5	1.7	0.12
27	10 5	20 27 48.20	19 46 49.5	0.5	1.8	0.13	12	7 0	20 24 19.21	19 57 50.1	0.4	1.7	0.12
28	10 1	20 27 40.13	19 47 16.8	0.5	1.8	0.13	13	6 57	20 24 19.10	19 57 48.8	0.4	1.7	0.12
29	9 57	20 27 32.17	19 47 43.7	0.5	1.8	0.13	14	6 53	20 24 19.20	19 57 46.9	0.4	1.7	0.12
30	9 53	20 27 24.34	19 48 10.2	0.5	1.8	0.13	15	6 49	20 24 19.50	19 57 44.3	0.4	1.7	0.12
31	9 49	20 27 16.63	−19 48 36.1	0.5	1.8	0.13	16	6 45	20 24 20.00	−19 57 40.9	0.4	1.7	0.12
Sept. 1	9 44	20 27 9.04	19 49 1.5	0.5	1.8	0.13	17	6 41	20 24 20.72	19 57 36.7	0.4	1.7	0.12
2	9 40	20 27 1.58	19 49 26.5	0.5	1.8	0.13	18	6 37	20 24 21.65	19 57 31.9	0.4	1.7	0.12
3	9 36	20 26 54.26	19 49 50.9	0.5	1.7	0.12	19	6 33	20 24 22.79	19 57 26.4	0.4	1.7	0.12
4	9 32	20 26 47.08	19 50 14.9	0.5	1.7	0.12	20	6 29	20 24 24.13	19 57 20.2	0.4	1.7	0.12
5	9 28	20 26 40.03	−19 50 38.3	0.5	1.7	0.12	21	6 25	20 24 25.69	−19 57 13.2	0.4	1.7	0.12
6	9 24	20 26 33.12	19 51 1.2	0.5	1.7	0.12	22	6 21	20 24 27.45	19 57 5.5	0.4	1.7	0.12
7	9 20	20 26 26.36	19 51 23.5	0.5	1.7	0.12	23	6 17	20 24 29.42	19 56 57.1	0.4	1.7	0.12
8	9 16	20 26 19.75	19 51 45.2	0.5	1.7	0.12	24	6 14	20 24 31.60	19 56 48.1	0.4	1.7	0.12
9	9 12	20 26 13.28	19 52 6.4	0.5	1.7	0.12	25	6 10	20 24 34.00	19 56 38.3	0.4	1.7	0.12
10	9 8	20 26 6.97	−19 52 27.0	0.5	1.7	0.12	26	6 6	20 24 36.61	−19 56 27.8	0.4	1.7	0.12
11	9 4	20 26 0.83	19 52 47.0	0.5	1.7	0.12	27	6 2	20 24 39.43	19 56 16.5	0.4	1.7	0.12
12	9 0	20 25 54.84	19 53 6.4	0.5	1.7	0.12	28	5 58	20 24 42.45	19 56 4.5	0.4	1.7	0.12
13	8 56	20 25 49.01	19 53 25.3	0.5	1.7	0.12	29	5 54	20 24 45.69	19 55 51.8	0.4	1.7	0.12
14	8 52	20 25 43.34	19 53 43.6	0.5	1.7	0.12	30	5 50	20 24 49.14	19 55 38.5	0.4	1.7	0.12
15	8 48	20 25 37.84	−19 54 1.2	0.5	1.7	0.12	31	5 46	20 24 52.80	−19 55 24.4	0.4	1.7	0.12
16	8 44	20 25 32.50	−19 54 18.2	0.5	1.7	0.12	Nov. 1	5 42	20 24 56.65	−19 55 9.6	0.4	1.7	0.12

Stellar magnitude at opposition, in July, 1913, 6.0.

NEPTUNE, 1913.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Jan. 0	13 6	7 47 27.58	+20 37 59.7	0.3	1.3	0.09	Feb. 15	10 0	7 42 16.62	+20 51 38.1	0.3	1.3	0.09
1	13 2	7 47 20.75	20 38 17.7	0.3	1.3	0.09	16	9 56	7 42 10.95	20 51 53.2	0.3	1.3	0.09
2	12 58	7 47 13.87	20 38 35.8	0.3	1.3	0.09	17	9 52	7 42 5.36	20 52 8.1	0.3	1.3	0.09
3	12 54	7 47 6.96	20 38 54.0	0.3	1.3	0.09	18	9 48	7 41 59.86	20 52 22.9	0.3	1.3	0.09
4	12 50	7 47 0.02	20 39 12.3	0.3	1.3	0.09	19	9 44	7 41 54.45	20 52 37.4	0.3	1.3	0.09
5	12 46	7 46 53.05	+20 39 30.6	0.3	1.3	0.09	20	9 40	7 41 49.14	+20 52 51.7	0.3	1.3	0.09
6	12 42	7 46 46.05	20 39 49.0	0.3	1.3	0.09	21	9 36	7 41 43.93	20 53 5.8	0.3	1.3	0.09
7	12 38	7 46 39.02	20 40 7.4	0.3	1.3	0.09	22	9 32	7 41 38.81	20 53 19.6	0.3	1.3	0.09
8	12 34	7 46 31.97	20 40 25.9	0.3	1.3	0.09	23	9 28	7 41 33.79	20 53 33.1	0.3	1.3	0.09
9	12 30	7 46 24.89	20 40 44.4	0.3	1.3	0.09	24	9 24	7 41 28.88	20 53 46.5	0.3	1.3	0.09
10	12 26	7 46 17.79	+20 41 2.9	0.3	1.3	0.09	25	9 20	7 41 24.06	+20 53 59.6	0.3	1.3	0.09
11	12 22	7 46 10.69	20 41 21.5	0.3	1.3	0.09	26	9 16	7 41 19.34	20 54 12.4	0.3	1.3	0.09
12	12 18	7 46 3.59	20 41 40.1	0.3	1.3	0.09	27	9 12	7 41 14.73	20 54 24.9	0.3	1.3	0.09
13	12 14	7 45 56.48	20 41 58.8	0.3	1.3	0.09	28	9 8	7 41 10.23	20 54 37.2	0.3	1.3	0.09
14	12 10	7 45 49.38	20 42 17.5	0.3	1.3	0.09	Mar. 1	9 4	7 41 5.84	20 54 49.3	0.3	1.3	0.09
15	12 6	7 45 42.27	+20 42 36.2	0.3	1.3	0.09	2	9 0	7 41 1.56	+20 55 1.1	0.3	1.3	0.09
16	12 2	7 45 35.16	20 42 54.9	0.3	1.3	0.09	3	8 56	7 40 57.40	20 55 12.6	0.3	1.3	0.09
17	11 57	7 45 28.05	20 43 13.5	0.3	1.3	0.09	4	8 52	7 40 53.36	20 55 23.8	0.3	1.3	0.09
18	11 53	7 45 20.96	20 43 32.2	0.3	1.3	0.09	5	8 48	7 40 49.43	20 55 34.7	0.3	1.3	0.09
19	11 49	7 45 13.87	20 43 50.8	0.3	1.3	0.09	6	8 44	7 40 45.62	20 55 45.4	0.3	1.3	0.09
20	11 45	7 45 6.79	+20 44 9.5	0.3	1.3	0.09	7	8 40	7 40 41.93	+20 55 55.9	0.3	1.3	0.09
21	11 41	7 44 59.72	20 44 27.9	0.3	1.3	0.09	8	8 36	7 40 38.36	20 56 6.0	0.3	1.3	0.09
22	11 37	7 44 52.67	20 44 46.4	0.3	1.3	0.09	9	8 32	7 40 34.92	20 56 15.8	0.3	1.3	0.09
23	11 33	7 44 45.65	20 45 4.8	0.3	1.3	0.09	10	8 28	7 40 31.60	20 56 25.4	0.3	1.3	0.09
24	11 29	7 44 38.66	20 45 23.2	0.3	1.3	0.09	11	8 24	7 40 28.40	20 56 34.6	0.3	1.3	0.09
25	11 25	7 44 31.70	+20 45 41.5	0.3	1.3	0.09	12	8 20	7 40 25.33	+20 56 43.5	0.3	1.3	0.09
26	11 21	7 44 24.76	20 45 59.8	0.3	1.3	0.09	13	8 16	7 40 22.40	20 56 52.1	0.3	1.3	0.09
27	11 17	7 44 17.86	20 46 17.9	0.3	1.3	0.09	14	8 12	7 40 19.60	20 57 0.4	0.3	1.3	0.09
28	11 13	7 44 11.00	20 46 35.9	0.3	1.3	0.09	15	8 8	7 40 16.92	20 57 8.3	0.3	1.3	0.09
29	11 9	7 44 4.17	20 46 53.8	0.3	1.3	0.09	16	8 4	7 40 14.37	20 57 15.9	0.3	1.3	0.09
30	11 5	7 43 57.39	+20 47 11.6	0.3	1.3	0.09	17	8 0	7 40 11.95	+20 57 23.3	0.3	1.3	0.09
31	11 1	7 43 50.65	20 47 29.3	0.3	1.3	0.09	18	7 56	7 40 9.67	20 57 30.4	0.3	1.3	0.09
Feb. 1	10 57	7 43 43.95	20 47 46.9	0.3	1.3	0.09	19	7 52	7 40 7.53	20 57 37.1	0.3	1.3	0.09
2	10 53	7 43 37.30	20 48 4.4	0.3	1.3	0.09	20	7 48	7 40 5.53	20 57 43.5	0.3	1.3	0.09
3	10 49	7 43 30.70	20 48 21.9	0.3	1.3	0.09	21	7 44	7 40 3.65	20 57 49.6	0.3	1.3	0.09
4	10 45	7 43 24.15	+20 48 39.2	0.3	1.3	0.09	22	7 40	7 40 1.90	+20 57 55.5	0.3	1.3	0.09
5	10 41	7 43 17.67	20 48 56.3	0.3	1.3	0.09	23	7 36	7 40 0.29	20 58 1.0	0.3	1.3	0.09
6	10 37	7 43 11.25	20 49 13.2	0.3	1.3	0.09	24	7 32	7 39 58.82	20 58 6.0	0.3	1.3	0.09
7	10 33	7 43 4.89	20 49 30.0	0.3	1.3	0.09	25	7 29	7 39 57.49	20 58 10.8	0.3	1.3	0.09
8	10 28	7 42 58.60	20 49 46.7	0.3	1.3	0.09	26	7 25	7 39 56.29	20 58 15.3	0.3	1.3	0.09
9	10 24	7 42 52.37	+20 50 3.2	0.3	1.3	0.09	27	7 21	7 39 55.24	+20 58 19.4	0.3	1.3	0.09
10	10 20	7 42 46.21	20 50 19.5	0.3	1.3	0.09	28	7 17	7 39 54.33	20 58 23.2	0.3	1.3	0.09
11	10 16	7 42 40.13	20 50 35.7	0.3	1.3	0.09	29	7 13	7 39 53.55	20 58 26.7	0.3	1.3	0.09
12	10 12	7 42 34.13	20 50 51.6	0.3	1.3	0.09	30	7 9	7 39 52.91	20 58 30.0	0.3	1.3	0.09
13	10 8	7 42 28.21	20 51 7.3	0.3	1.3	0.09	31	7 5	7 39 52.41	20 58 32.8	0.3	1.3	0.09
14	10 4	7 42 22.37	+20 51 22.8	0.3	1.3	0.09	Apr. 1	7 1	7 39 52.05	+20 58 35.3	0.3	1.3	0.09
15	10 0	7 42 16.62	+20 51 38.1	0.3	1.3	0.09	2	6 57	7 39 51.83	+20 58 37.5	0.3	1.3	0.09

Stellar magnitude at opposition, in January, 1913, 7.7.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
Apr. 1	7 1	7 39 52.05	+20 58 35.3	0.3	1.3	0.09
2	6 57	7 39 51.83	20 58 37.5	0.3	1.3	0.09
3	6 53	7 39 51.76	20 58 39.4	0.3	1.3	0.09
4	6 49	7 39 51.84	20 58 40.9	0.3	1.3	0.09
5	6 45	7 39 52.06	20 58 42.1	0.3	1.3	0.09
6	6 41	7 39 52.42	+20 58 42.9	0.3	1.3	0.09
7	6 37	7 39 52.91	20 58 43.3	0.3	1.3	0.09
8	6 33	7 39 53.54	20 58 43.3	0.3	1.3	0.09
9	6 29	7 39 54.32	20 58 43.1	0.3	1.3	0.09
10	6 26	7 39 55.24	20 58 42.6	0.3	1.3	0.09
11	6 22	7 39 56.30	+20 58 41.7	0.3	1.3	0.09
12	6 18	7 39 57.50	20 58 40.5	0.3	1.3	0.09
13	6 14	7 39 58.84	20 58 38.9	0.3	1.3	0.09
14	6 10	7 40 0.33	20 58 37.0	0.3	1.3	0.09
15	6 6	7 40 1.95	20 58 34.8	0.3	1.3	0.09
16	6 2	7 40 3.71	+20 58 32.3	0.3	1.3	0.09
17	5 58	7 40 5.61	20 58 29.4	0.3	1.3	0.09
18	5 54	7 40 7.65	20 58 26.1	0.3	1.3	0.09
19	5 50	7 40 9.82	20 58 22.4	0.3	1.3	0.09
20	5 46	7 40 12.13	+20 58 18.3	0.3	1.3	0.09
Oct. 21	18 0	8 0 53.88	+20 5 37.2	0.3	1.3	0.09
22	17 56	8 0 55.17	20 5 33.2	0.3	1.3	0.09
23	17 52	8 0 56.32	20 5 29.5	0.3	1.3	0.09
24	17 48	8 0 57.33	20 5 26.3	0.3	1.3	0.09
25	17 44	8 0 58.19	20 5 23.5	0.3	1.3	0.09
26	17 40	8 0 58.92	+20 5 21.1	0.3	1.3	0.09
27	17 36	8 0 59.50	20 5 19.1	0.3	1.3	0.09
28	17 32	8 0 59.94	20 5 17.6	0.3	1.3	0.09
29	17 28	8 1 0.23	20 5 16.5	0.3	1.3	0.09
30	17 24	8 1 0.39	20 5 15.8	0.3	1.3	0.09
31	17 21	8 1 0.40	+20 5 15.5	0.3	1.3	0.09
Nov. 1	17 17	8 1 0.28	20 5 15.5	0.3	1.3	0.09
2	17 13	8 1 0.01	20 5 16.0	0.3	1.3	0.09
3	17 9	8 0 59.60	20 5 16.9	0.3	1.3	0.09
4	17 5	8 0 59.05	20 5 18.2	0.3	1.3	0.09
5	17 1	8 0 58.35	+20 5 20.0	0.3	1.3	0.09
6	16 57	8 0 57.52	20 5 22.1	0.3	1.3	0.09
7	16 53	8 0 56.56	20 5 24.6	0.3	1.3	0.09
8	16 49	8 0 55.45	20 5 27.6	0.3	1.3	0.09
9	16 45	8 0 54.20	20 5 30.9	0.3	1.3	0.09
10	16 41	8 0 52.81	+20 5 34.6	0.3	1.3	0.09
11	16 37	8 0 51.29	20 5 38.7	0.3	1.3	0.09
12	16 33	8 0 49.63	20 5 43.3	0.3	1.3	0.09
13	16 29	8 0 47.82	20 5 48.3	0.3	1.3	0.09
14	16 25	8 0 45.88	20 5 53.7	0.3	1.3	0.09
15	16 21	8 0 43.82	+20 5 59.5	0.3	1.3	0.09
16	16 17	8 0 41.62	+20 6 5.6	0.3	1.3	0.09
Nov. 16	16 17	8 0 41.62	+20 6 5.6	0.3	1.3	0.09
17	16 13	8 0 39.28	20 6 12.1	0.3	1.3	0.09
18	16 9	8 0 36.81	20 6 19.0	0.3	1.3	0.09
19	16 5	8 0 34.21	20 6 26.3	0.3	1.3	0.09
20	16 1	8 0 31.48	20 6 33.9	0.3	1.3	0.09
21	15 57	8 0 28.62	+20 6 42.0	0.3	1.3	0.09
22	15 53	8 0 25.62	20 6 50.5	0.3	1.3	0.09
23	15 49	8 0 22.50	20 6 59.3	0.3	1.3	0.09
24	15 45	8 0 19.26	20 7 8.5	0.3	1.3	0.09
25	15 42	8 0 15.89	20 7 17.9	0.3	1.3	0.09
26	15 38	8 0 12.39	+20 7 27.8	0.3	1.3	0.09
27	15 34	8 0 8.78	20 7 38.0	0.3	1.3	0.09
28	15 30	8 0 5.05	20 7 48.5	0.3	1.3	0.09
29	15 26	8 0 1.19	20 7 59.5	0.3	1.3	0.09
30	15 22	7 59 57.21	20 8 10.9	0.3	1.3	0.09
Dec. 1	15 18	7 59 53.11	+20 8 22.5	0.3	1.3	0.09
2	15 14	7 59 48.90	20 8 34.4	0.3	1.3	0.09
3	15 10	7 59 44.58	20 8 46.8	0.3	1.3	0.09
4	15 6	7 59 40.15	20 8 59.5	0.3	1.3	0.09
5	15 2	7 59 35.61	20 9 12.5	0.3	1.3	0.09
6	14 58	7 59 30.96	+20 9 25.7	0.3	1.3	0.09
7	14 54	7 59 26.20	20 9 39.2	0.3	1.3	0.09
8	14 50	7 59 21.34	20 9 53.0	0.3	1.3	0.09
9	14 46	7 59 16.38	20 10 7.1	0.3	1.3	0.09
10	14 41	7 59 11.32	20 10 21.5	0.3	1.3	0.09
11	14 37	7 59 6.17	+20 10 36.2	0.3	1.3	0.09
12	14 33	7 59 0.92	20 10 51.2	0.3	1.3	0.09
13	14 29	7 58 55.57	20 11 6.4	0.3	1.3	0.09
14	14 25	7 58 50.13	20 11 21.9	0.3	1.3	0.09
15	14 21	7 58 44.60	20 11 37.7	0.3	1.3	0.09
16	14 17	7 58 38.99	+20 11 53.8	0.3	1.3	0.09
17	14 13	7 58 33.29	20 12 10.1	0.3	1.3	0.09
18	14 9	7 58 27.50	20 12 26.6	0.3	1.3	0.09
19	14 5	7 58 21.63	20 12 43.3	0.3	1.3	0.09
20	14 1	7 58 15.69	20 13 0.2	0.3	1.3	0.09
21	13 57	7 58 9.67	+20 13 17.4	0.3	1.3	0.09
22	13 53	7 58 3.57	20 13 34.8	0.3	1.3	0.09
23	13 49	7 57 57.40	20 13 52.5	0.3	1.3	0.09
24	13 45	7 57 51.17	20 14 10.4	0.3	1.3	0.09
25	13 41	7 57 44.87	20 14 28.4	0.3	1.3	0.09
26	13 37	7 57 38.50	+20 14 46.5	0.3	1.3	0.09
27	13 33	7 57 32.07	20 15 4.8	0.3	1.3	0.09
28	13 29	7 57 25.58	20 15 23.3	0.3	1.3	0.09
29	13 25	7 57 19.04	20 15 42.0	0.3	1.3	0.09
30	13 21	7 57 12.44	20 16 0.8	0.3	1.3	0.09
31	13 17	7 57 5.79	+20 16 19.8	0.3	1.3	0.09
32	13 13	7 56 59.09	+20 16 38.9	0.3	1.3	0.09

Stellar magnitude at opposition, in January, 1914, 7.7.

PART III.

PHENOMENA.

In the year 1913 there will be five eclipses, three of the Sun and two of the Moon.

I.—*A Total Eclipse of the Moon*, 1913, March 21–22, partly visible at Washington, the Moon setting eclipsed; the beginning visible generally in North America, western South America, throughout the Pacific Ocean, Australia, and the eastern border of Asia; the ending visible generally in western North America, the Pacific Ocean, Australia, central and eastern Asia.

ELEMENTS OF THE ECLIPSE.

	d	h	m	s
Greenwich mean time of ☍ in right ascension, March	21	23	47	57.7

	h m s		s
Sun's right ascension	0 4 37.49	Hourly motion	9.10
Moon's right ascension	12 4 37.49	Hourly motion	132.19
	° ′ ″		′ ″
Sun's declination	0 30 5.7 N.	Hourly motion	0 59.2 N.
Moon's declination	0 18 26.1 S.	Hourly motion	18 7.3 S.
Sun's equa. hor. parallax	8.8	Sun's true semidiameter	16 2.8
Moon's equa. hor. parallax	60 58.9	Moon's true semidiameter	16 36.2

CIRCUMSTANCES OF THE ECLIPSE.

		d	h	m	
Moon enters penumbra	March	21	21	16.3	Greenwich Mean Time.
Moon enters shadow		21	22	12.6	
Total eclipse begins		21	23	10.9	
Middle of the eclipse		21	23	57.6	
Total eclipse ends		22	0	44.4	
Moon leaves shadow		22	1	42.6	
Moon leaves penumbra		22	2	38.9	

Contacts of Shadow with Moon's limb.	Angles of position from the north point.	The Moon being in the zenith in longitude from Greenwich.	and in latitude.
	°	° ′	° ′
First	128 to E.	152 11 W.	0 10 N.
Last	70 to W.	157 6 E.	0 53 S.

Magnitude of the eclipse = 1.575 (Moon's diameter = 1.0).

II.—*A Partial Eclipse of the Sun*, 1913, April 6, invisible at Washington.

ELEMENTS OF THE ECLIPSE.

	d	h	m	s
Greenwich mean time of ☌ in right ascension, April	6	6	54	57.9

	h m s		s	s
Sun and Moon's R. A.	1 0 18.70	Hourly motion	9.14 and	109.32

	° ′ ″		′ ″
Sun's declination	6 26 20.3 N.	Hourly motion	0 56.7 N.
Moon's declination	7 47 54.8 N.	Hourly motion	14 14.0 N.
Sun's equa. hor. parallax	8.8	Sun's true semidiameter	15 58.5
Moon's equa. hor. parallax	54 51.4	Moon's true semidiameter	14 56.2

CIRCUMSTANCES OF THE ECLIPSE.

		Greenwich Mean Time.			Longitude from Greenwich.	Latitude.
		d	h	m	° ′	° ′
Eclipse begins	April	6	3	53.9	151 24.1 W.	28 59.0 N.
Greatest eclipse		6	5	32.9	175 32.3 E.	61 20.5 N.
Eclipse ends		6	7	11.2	37 49.1 E.	82 9.3 N.

Magnitude of greatest eclipse = 0.424 (Sun's diameter = 1.0).

III.—*A Partial Eclipse of the Sun*, 1913, August 31, invisible at Washington.

ELEMENTS OF THE ECLIPSE.

		d h m s
Greenwich mean time of ☌ in right ascension,	August	31 7 34 56.7

	h m s		s s
Sun and Moon's R. A.	10 37 45.36	Hourly motion	9.09 and 137.98
	° ' "		' "
Sun's declination	8 39 48.0 N.	Hourly motion	0 54.1 S.
Moon's declination	10 19 39.3 N.	Hourly motion	17 14.2 S.
Sun's equa. hor. parallax	8.7	Sun's true semidiameter	15 51.0
Moon's equa. hor. parallax	61 17.3	Moon's true semidiameter	16 41.2

CIRCUMSTANCES OF THE ECLIPSE.

		Greenwich Mean Time.	Longitude from Greenwich.	Latitude.
		d h m	° '	° '
Eclipse begins	August	31 8 2.5	13 16.0 E.	77 36.3 N.
Greatest eclipse		31 8 52.0	26 36.2 W.	61 36.5 N.
Eclipse ends		31 9 42.0	47 5.0 W.	43 44.5 N.

Magnitude of greatest eclipse = 0.151 (Sun's diameter = 1.0).

IV.—*A Total Eclipse of the Moon*, 1913, September 14–15, the moon setting at Washington as the eclipse begins; the beginning visible generally in North America excepting the extreme northern portions, the Pacific Ocean, Australia, and eastern Asia; the ending visible generally in Alaska, the Pacific Ocean excepting the eastern portions, Australia, and Asia.

ELEMENTS OF THE ECLIPSE.

		d h m s
Greenwich mean time of ☍ in right ascension,	September	15 0 34 9.4

	h m s		s
Sun's right ascension	11 30 47.50	Hourly motion	8.97
Moon's right ascension	23 30 47.50	Hourly motion	104.22
	° ' "		' "
Sun's declination	3 9 22.0 N.	Hourly motion	0 57.7 S.
Moon's declination	3 22 23.2 S.	Hourly motion	14 8.8 N.
Sun's equa. hor. parallax	8.8	Sun's true semidiameter	15 54.6
Moon's equa. hor. parallax	53 58.2	Moon's true semidiameter	14 41.7

CIRCUMSTANCES OF THE ECLIPSE.

		d h m	
Moon enters penumbra	September	14 21 39.9	Greenwich Mean Time.
Moon enters shadow		14 22 52.5	
Total eclipse begins		15 0 1.0	
Middle of the eclipse		15 0 48.1	
Total eclipse ends		15 1 35.2	
Moon leaves shadow		15 2 43.6	
Moon leaves penumbra		15 3 56.3	

Contacts of Shadow with Moon's limb.	Angles of position from the north point.	The Moon being in the zenith in longitude from Greenwich.	and in latitude.
	°	° '	° '
First	49 to E.	164 58 W.	3 46 S.
Last	107 to W.	138 46 E.	2 52 S.

Magnitude of the eclipse = 1.435 (Moon's diameter = 1.0).

V.—*A Partial Eclipse of the Sun*, 1913, September 29, invisible at Washington.

ELEMENTS OF THE ECLIPSE.

		d	h	m	s
Greenwich mean time of ☌ in right ascension,	September	29	17	48	1.8

	h	m	s		s		s
Sun and Moon's R. A.	12	23	43.00	Hourly motions	9.04	and	134.16

	°	′	″			′	″	
Sun's declination	2	33	57.9	S.	Hourly motion	0	58.4	S.
Moon's declination	3	50	48.1	S.	Hourly motion	18	9.0	S.
Sun's equa. hor. parallax			8.8		Sun's true semidiameter	15	58.5	
Moon's equa. hor. parallax		61	17.6		Moon's true semidiameter	16	41.3	

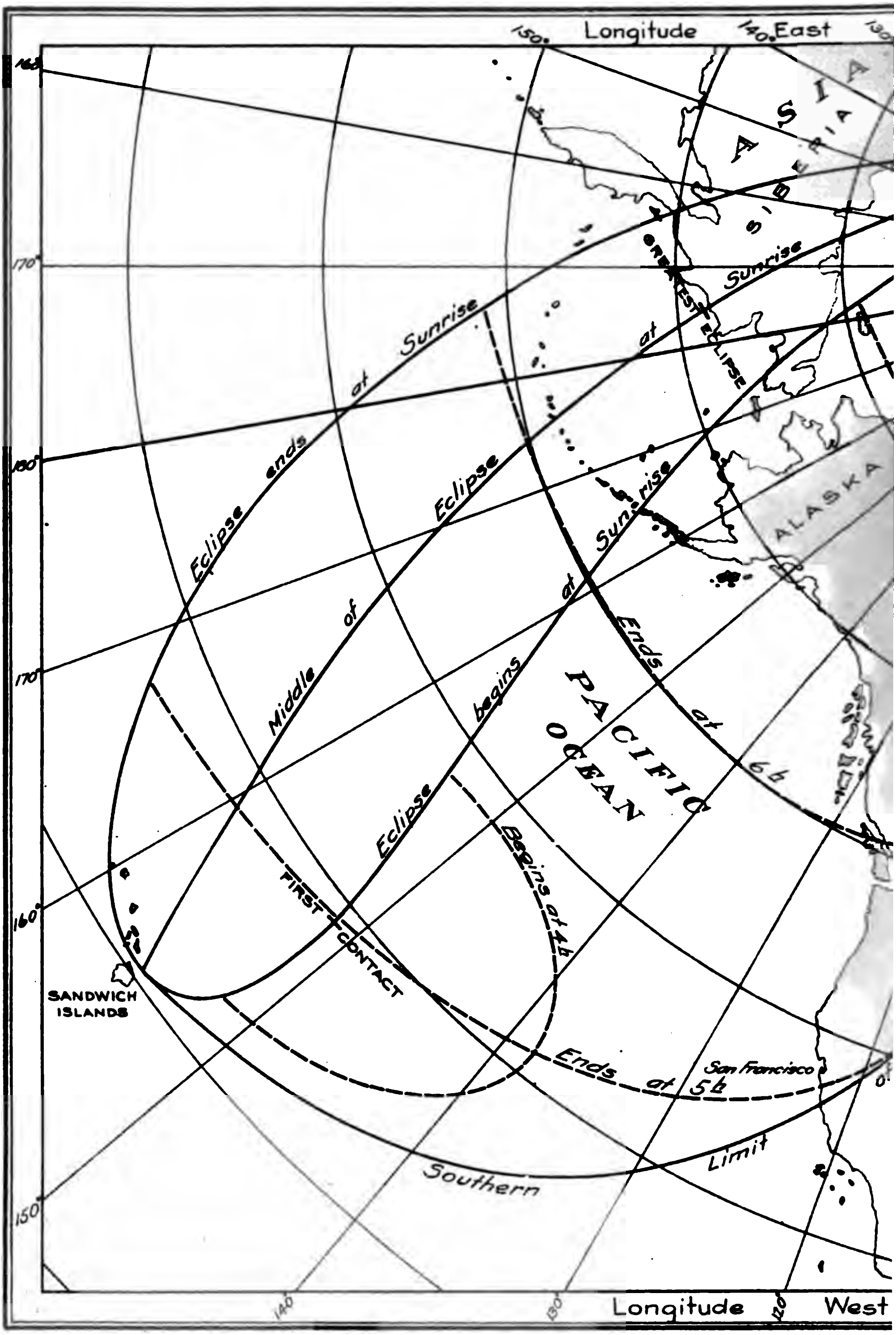
CIRCUMSTANCES OF THE ECLIPSE.

		Greenwich Mean Time.			Longitude from Greenwich.			Latitude.		
		d	h	m	°	′		°	′	
Eclipse begins	September	29	14	55.6	42	54.0	E.	17	5.2	S.
Greatest eclipse		29	16	45.6	11	31.2	E.	61	12.6	S.
Eclipse ends		29	18	35.2	178	12.4	E.	74	41.3	S.

Magnitude of greatest eclipse = 0.825 (Sun's diameter = 1.0).

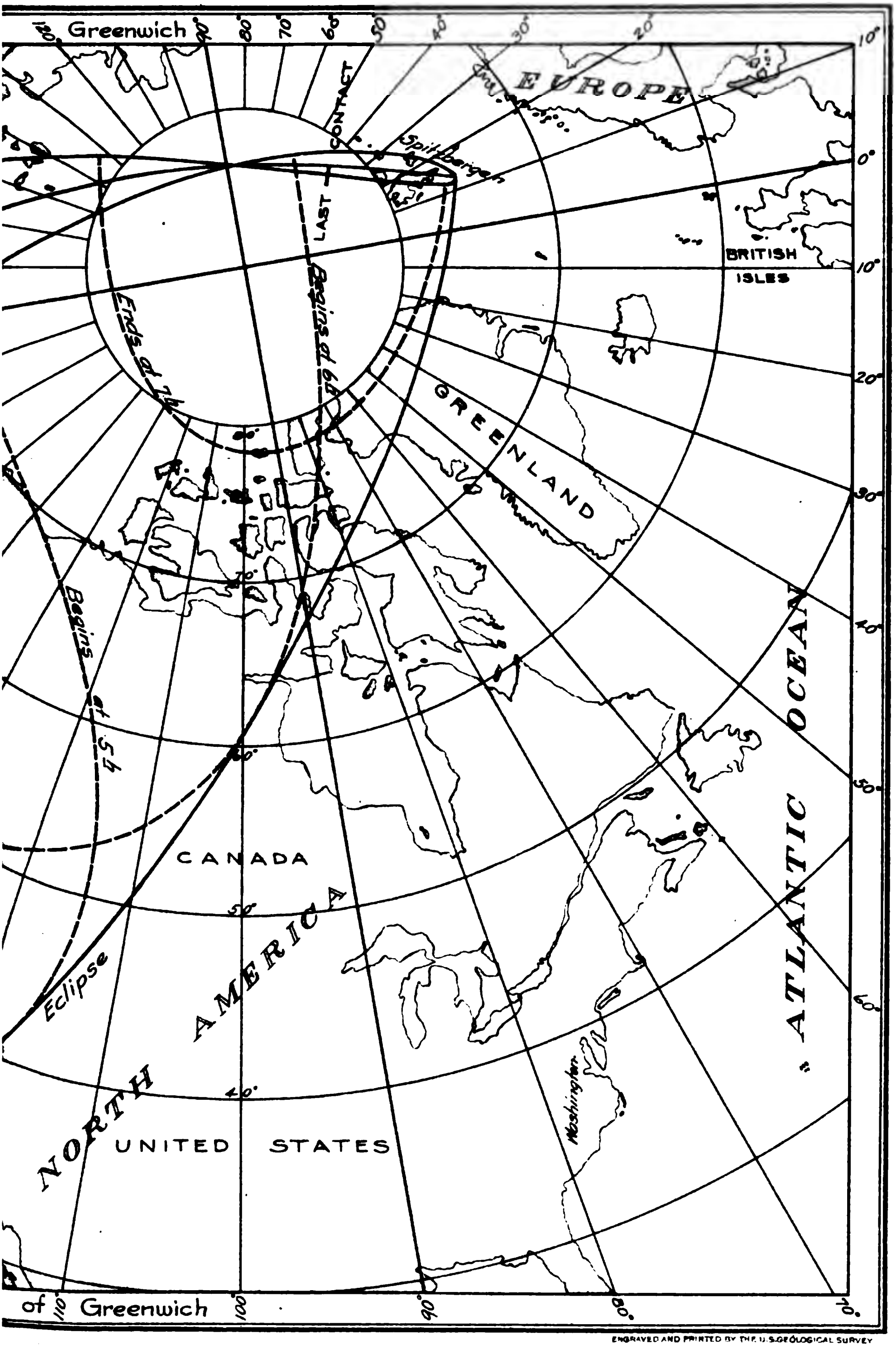
The regions within which the eclipses of the Sun are visible are laid down on the accompanying charts, from which, by means of the dotted lines, the Greenwich mean times of beginning and ending at any place may be found with an uncertainty which will vary from three or four minutes for a high Sun to fifteen or twenty minutes when the Sun is near the horizon.

PARTIAL ECLIPSE OF



Note:- The hours of beginning and endi

HE SUN APR. 6, 1913.



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are expressed in Greenwich Mean Time

BESSELIAN ELEMENTS OF THE PARTIAL ECLIPSE OF THE SUN, 1913, APRIL 6.

Greenwich Mean Time.	Coordinates of Center of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra on Fundamental Plane.
	x	*y*	Log sin *d*	Log cos *d*	*μ*	*l*
h m					° '	
3 50	−1.39776	+0.74291	+9.04638	+9.99729	56 51.6	+0.56517
4 0	−1.32222	+0.78338	+9.04655	+9.99729	59 21.6	+0.56516
10	1.24668	0.82386	9.04672	9.99729	61 51.7	0.56515
20	1.17113	0.86433	9.04690	9.99729	64 21.7	0.56514
30	1.09558	0.90479	9.04707	9.99729	66 51.8	0.56513
40	1.02003	0.94526	9.04724	9.99728	69 21.8	0.56512
50	0.94447	0.98571	9.04741	9.99728	71 51.8	0.56511
5 0	−0.86891	+1.02617	+9.04758	+9.99728	74 21.9	+0.56510
10	0.79334	1.06662	9.04775	9.99728	76 51.9	0.56508
20	0.71777	1.10706	9.04792	9 99728	79 22.0	0.56507
30	0.64220	1.14751	9.04809	9.99727	81 52.0	0.56506
40	0.56663	1.18794	9.04826	9.99727	84 22.0	0.56504
50	0.49105	1.22838	9.04843	9.99727	86 52.1	0.56503
6 0	−0.41547	+1.26881	+9.04860	+9.99727	89 22.1	+0.56501
10	0.33988	1.30924	9.04877	9.99726	91 52.2	0.56500
20	0.26430	1.34966	9.04894	9.99726	94 22.2	0.56498
30	0.18871	1.39007	9.04911	9.99726	96 52.2	0.56496
40	0.11312	1.43048	9.04928	9.99726	99 22.3	0.56495
50	−0.03753	1.47089	9.04945	9.99726	101 52.3	0.56493
7 0	+0.03806	+1.51129	+9.04962	+9.99725	104 22.4	+0.56491
10	0.11366	1.55169	9.04979	9.99725	106 52.4	0.56489
20	+0.18926	+1.59208	+9.04995	+9.99725	109 22.4	+0.56487

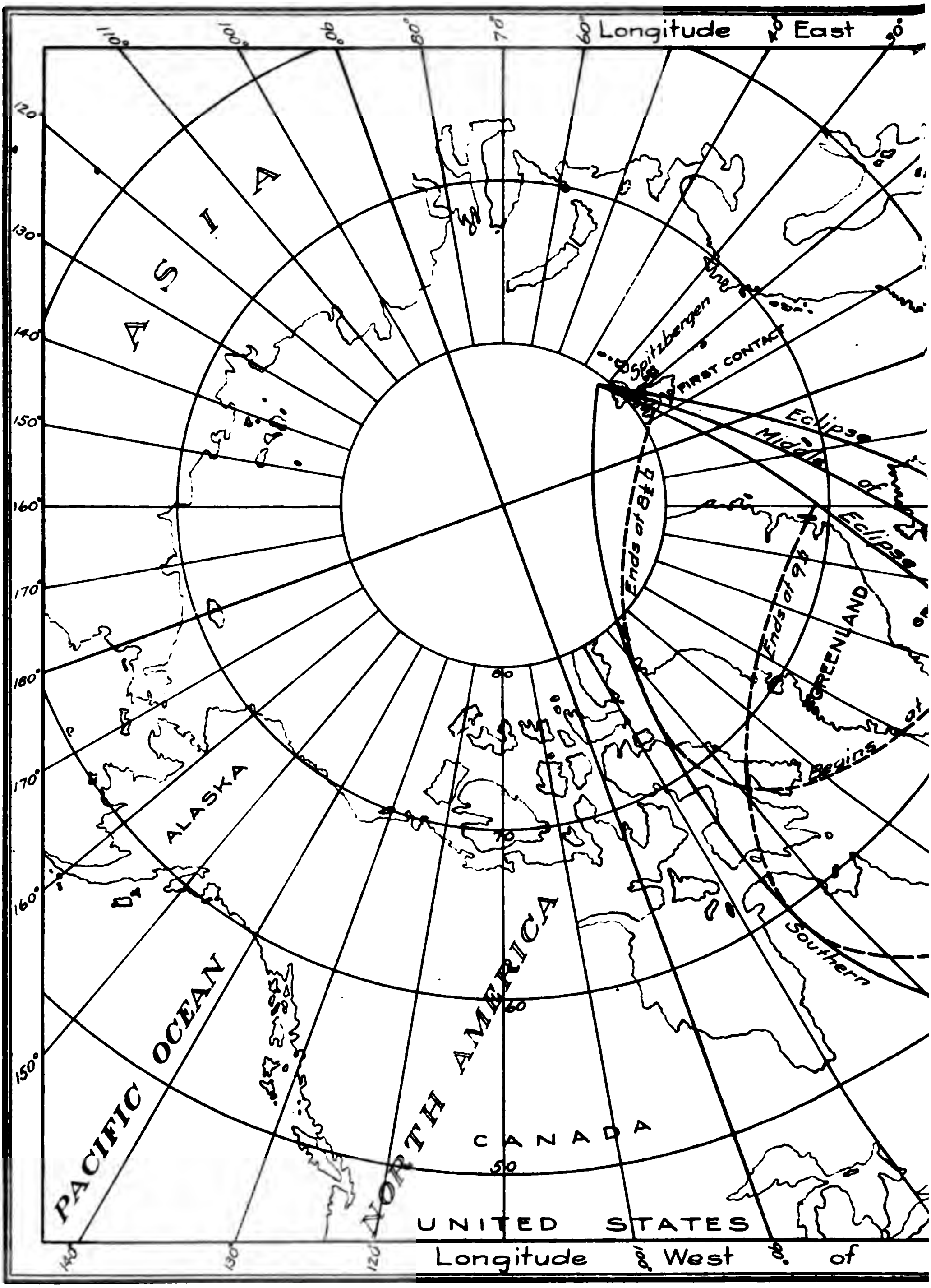
Greenwich Mean Time.	Log *x'* for 1 Minute.	Log *y'* for 1 Minute.	Log *μ'* for 1 Minute.	Log Tangent of Angle of Cone.
				Penumbra.
h m				
3 0	+7.8780	+7.6074	+1.1762	+7.66942
4 0	7.8782	7.6072	1.1762	7.66941
5 0	7.8783	7.6069	1.1762	7.66941
6 0	7.8784	7.6067	1.1762	7.66940
7 0	7.8785	7.6064	1.1762	7.66940
8 0	+7.8785	+7.6061	+1.1762	+7.66939

BESSELIAN ELEMENTS OF THE PARTIAL ECLIPSE OF THE SUN, 1913, AUGUST 31.

Greenwich Mean Time.	Coordinates of Center of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra on Fundamental Plane.
	x	*y*	Log sin *d*	Log cos *d*	*μ*	*l*
h m					° ′	
8 0	+0.21650	+1.52137	+9.17741	+9.99503	119 55.9	+0.53205
10	0.30290	1.47681	9.17729	9.99503	122 26.0	0.53205
20	0.38930	1.43224	9.17717	9.99503	124 56.0	0.53205
30	0.47570	1.38766	9.17705	9.99504	127 26.0	0.53205
40	0.56210	1.34308	9.17693	9.99504	129 56.1	0.53204
50	0.64850	1.29849	9.17681	9.99504	132 26.1	0.53204
9 0	+0.73489	+1.25389	+9.17669	+9.99504	134 56.2	+0.53204
10	0.82128	1.20928	9.17657	9.99505	137 26.2	0.53203
20	0.90766	1.16467	9.17645	9.99505	139 56.3	0.53203
30	0.99404	1.12005	9.17633	9.99505	142 26.3	0.53202
40	1.08042	1.07543	9.17621	9.99506	144 56.4	0.53201
50	+1.16679	+1.03079	+9.17609	+9.99506	147 26.4	+0.53200

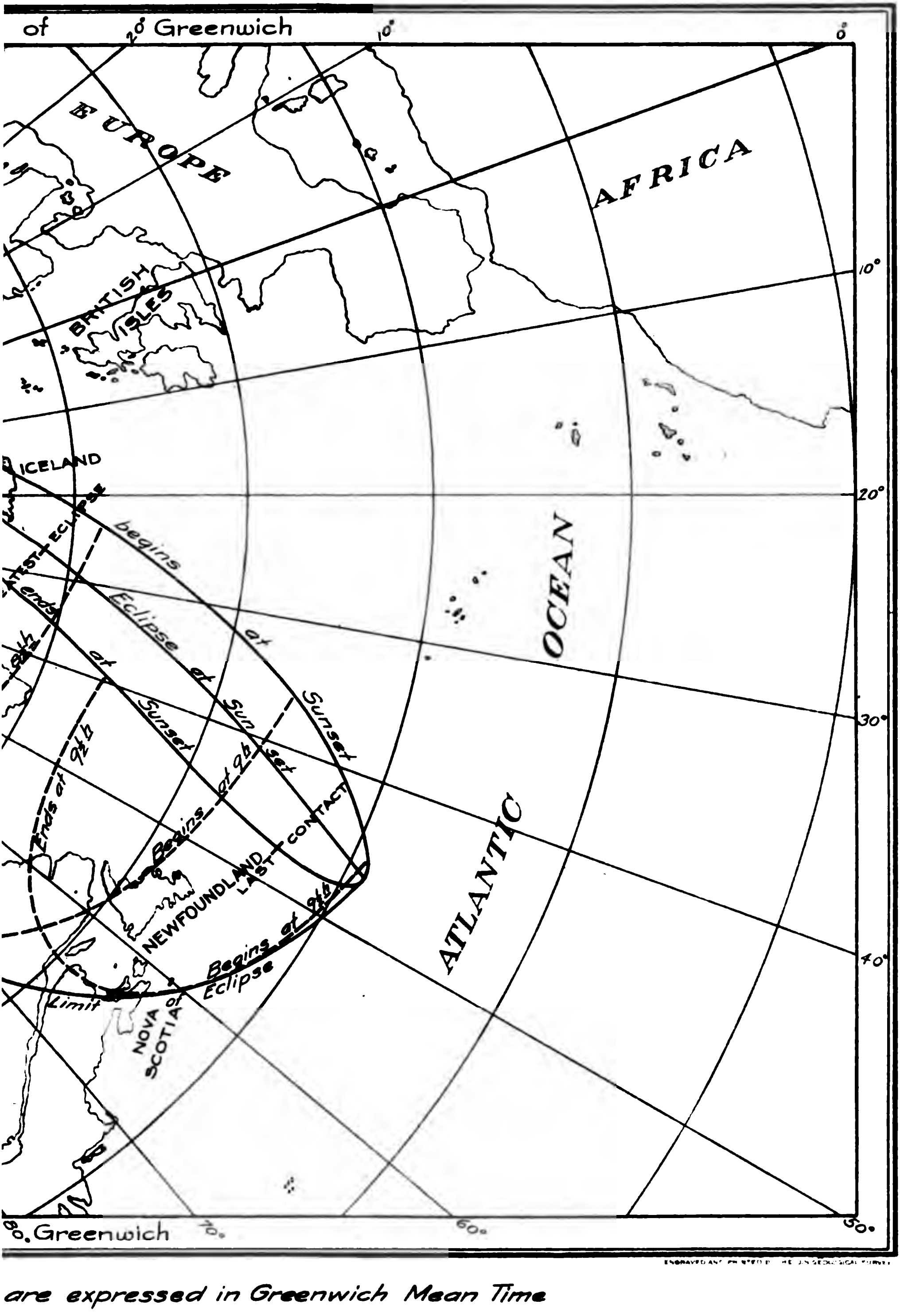
Greenwich Mean Time.	Log *x*′ for 1 Minute.	Log *y*′ for 1 Minute.	Log *μ*′ for 1 Minute.	Log Tangent of Angle of Cone.
				Penumbra.
h m				
8 0	+7.9365	−7.6489	+1.1762	+7.66586
9 0	7.9364	7.6493	1.1762	7.66586
10 0	+7.9363	−7.6497	+1.1762	+7.66586

PARTIAL ECLIPSE OF T



Note÷ The hours of beginning and ending

THE SUN AUG. 31, 1913.



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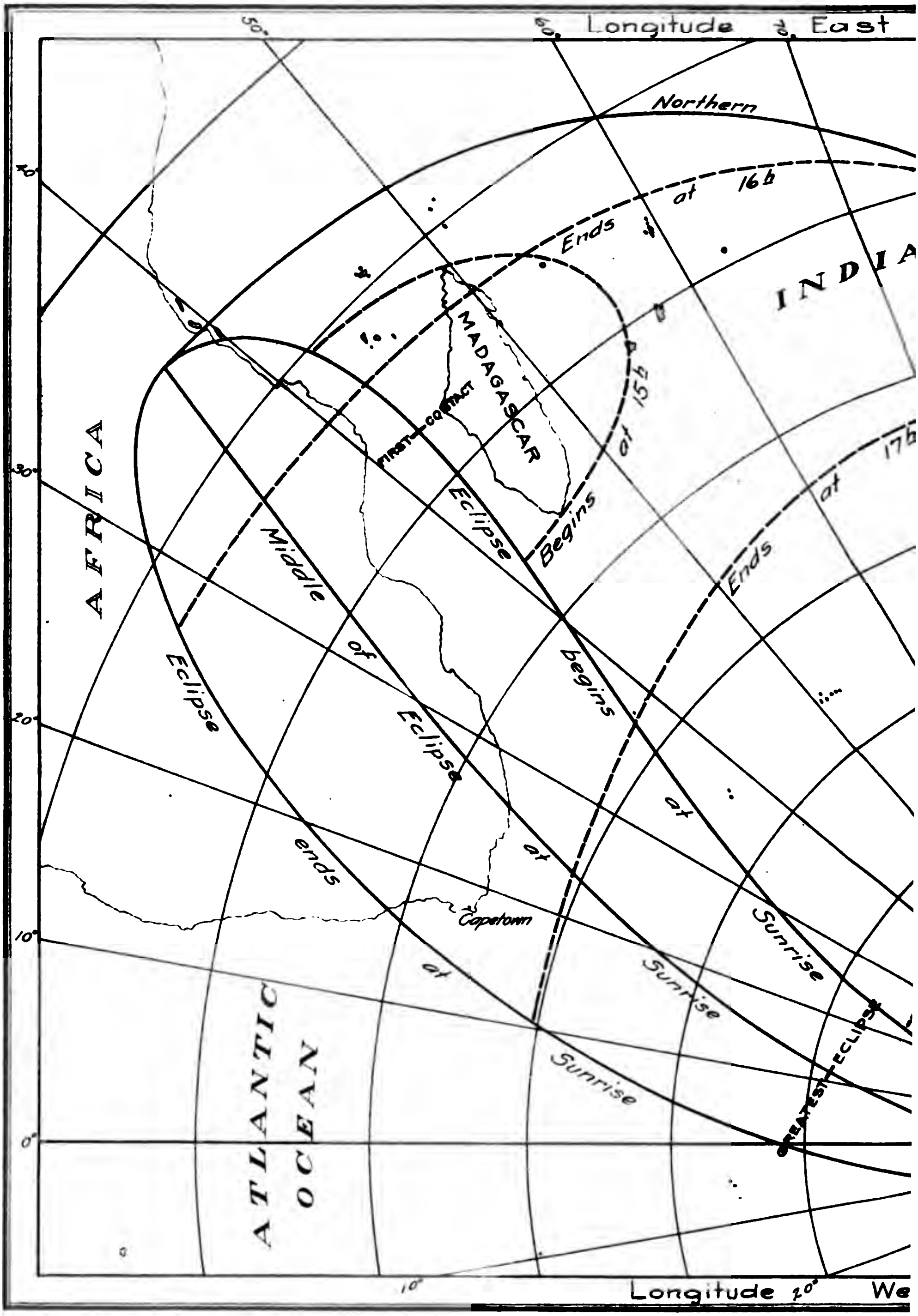
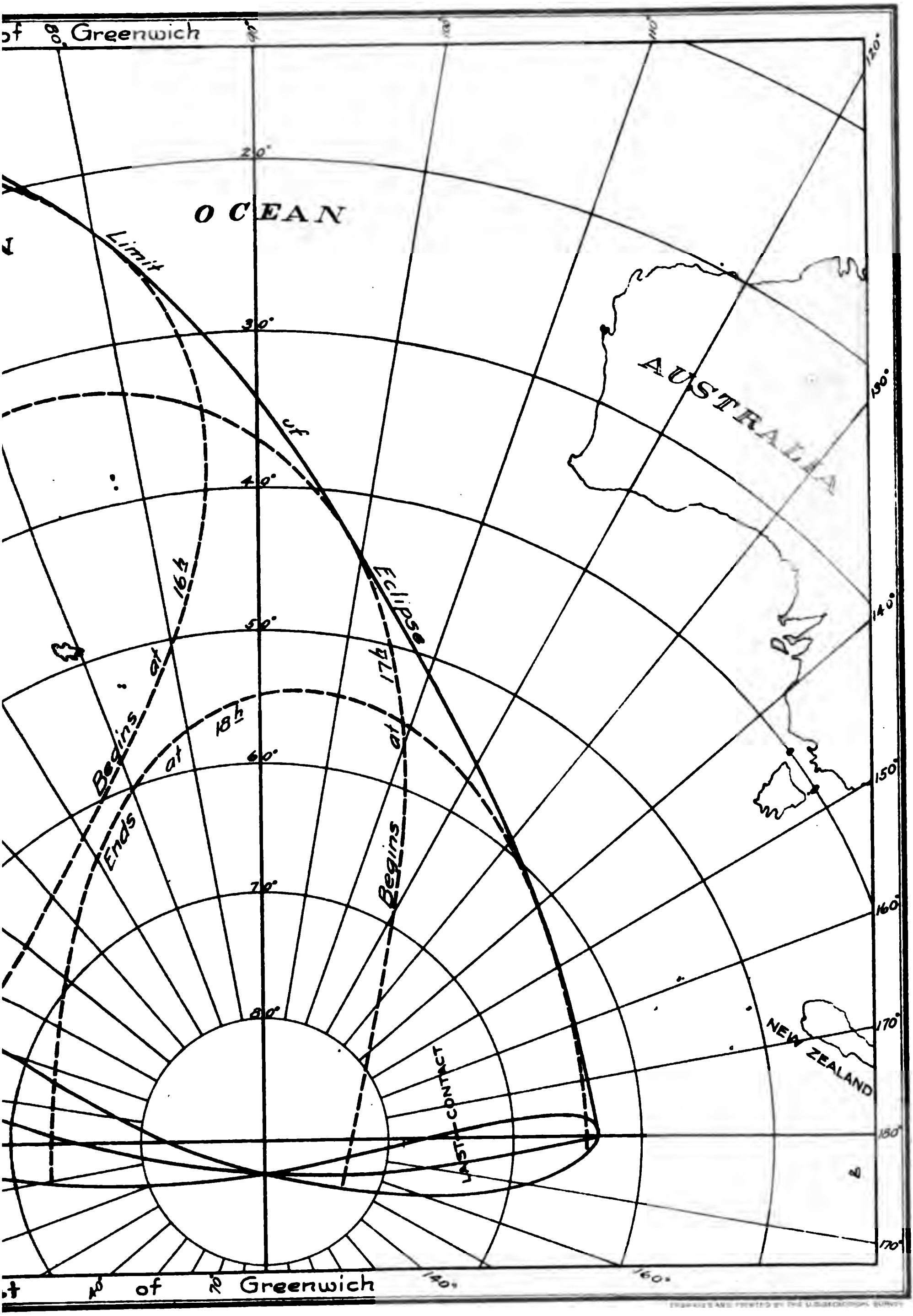
PARTIAL ECLIPSE OF '



Note:- The hours of beginning and endi

HE SUN SEPT. 29, 1913.



ng are expressed in Greenwich Mean Time

BESSELIAN ELEMENTS OF THE PARTIAL ECLIPSE OF THE SUN, 1913, SEPTEMBER 29.

Greenwich Mean Time.	Coordinates of Center of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra on Fundamental Plane.
	x	y	Log sin d	Log cos d	μ	l
h m					° ′	
14 50	−1.51422	−0.42211	−8.64261	+9·99958	224 55·7	+0.53401
15 0	−1.42919	−0.46901	−8.64305	+9·99958	227 25·8	+0.53402
10	1.34416	0.51591	8.64350	9·99958	229 55·8	0.53403
20	1.25913	0.56280	8.64394	9·99958	232 25·9	0.53404
30	1.17409	0.60969	8.64439	9·99958	234 55·9	0.53405
40	1.08904	0.65658	8.64483	9·99958	237 26.0	0.53406
50	1.00399	0.70346	8.64528	9·99958	239 56.0	0.53407
16 0	−0.91894	−0.75034	−8.64572	+9·99957	242 26.1	+0.53408
10	0.83389	0.79722	8.64616	9·99957	244 56.1	0.53409
20	0.74883	0.84409	8.64661	9·99957	247 26.2	0.53410
30	0.66378	0.89096	8.64705	9·99957	249 56.2	0.53410
40	0.57871	0.93783	8.64749	9·99957	252 26.3	0.53411
50	0.49365	0.98469	8.64793	9·99957	254 56.3	0.53411
17 0	−0.40858	−1.03155	−8.64837	+9·99957	257 26.4	+0.53412
10	0.32352	1.07840	8.64881	9·99957	259 56.4	0.53412
20	0.23845	1.12525	8.64925	9·99957	262 26.4	0.53413
30	0.15338	1.17209	8.64969	9·99957	264 56.5	0.53413
40	−0.06831	1.21893	8.65013	9·99957	267 26.5	0.53413
50	+0.01676	1.26577	8.65057	9·99957	269 56.6	0.53413
18 0	+0.10183	−1.31260	−8.65101	+9·99956	272 26.6	+0.53413
10	0.18690	1.35943	8.65145	9·99956	274 56.7	0.53413
20	0.27197	1.40625	8.65188	9·99956	277 26.7	0.53413
30	0.35704	1.45307	8.65232	9·99956	279 56.8	0.53413
40	+0.44211	−1.49988	−8.65276	+9·99956	282 26.8	+0.53412

Greenwich Mean Time.	Log x' for 1 Minute.	Log y' for 1 Minute.	Log μ' for 1 Minute.	Log Tangent of Angle of Cone.
				Penumbra.
h m				
14 0	+7.9294	−7.6713	+1.1762	+7.66926
15 0	7.9296	7.6712	1.1762	7.66927
16 0	7.9297	7.6710	1.1762	7.66927
17 0	7.9298	7.6708	1.1762	7.66928
18 0	7.9298	7.6705	1.1762	7.66928
19 0	+7.9298	−7.6702	+1.1762	+7.66929

MEAN PLACES FOR 1913.0. (January $0^{d}.248$, Washington.)

Name of Star.	Magni-tude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		h m s	s	° ′ ″	″
80 B. Piscium . .	6.3	0 0 36.204	+0.0037	− 0 59 9.74	−0.052
98 B. Piscium . .	6.3	0 13 19.533	+0.0051	+ 1 12 18.47	+0.012
44 Piscium . .	6.0	0 20 56.538	−0.0014	1 27 28.44	−0.023
60 Piscium . .	6.2	0 42 53.577	+0.0010	6 15 58.97	−0.005
62 Piscium . .	6.1	0 43 46.490	+0.0070	6 49 30.47	+0.008
147 B. Piscium . .	5.9	0 43 48.993	+0.0483	+ 4 50 1.06	−1.132
δ Piscium . .	4.6	0 44 10.031	+0.0055	7 6 42.47	−0 044
171 B. Piscium . .	6.3	0 55 18.971	+0.0008	6 0 50.88	−0 005
ε Piscium . .	4.4	0 58 25.585	−0.0054	7 25 19.06	+0.026
π Piscium . .	5.6	1 32 29.044	−0.0049	11 41 48.48	+0.034
20 H.[1] Arietis . .	6.4	2 4 36.174	+0.0112	+16 49 0.11	−0.179
19 Arietis . .	5.8	2 8 18.423	+0.0071	14 52 21.24	−0.021
26 Arietis . .	6.2	2 25 45.474	+0.0050	19 28 10.97	−0.022
27 Arietis . .	6.4	2 26 4.705	+0.0029	17 19 10.34	−0.089
μ Arietis . .	5.7	2 37 27.466	+0.0023	19 38 29.06	−0.038
40 Arietis . .	6.0	2 43 39.248	+0.0030	+17 55 19.19	−0.019
47 Arietis . .	5.8	2 53 6.248	+0.0160	20 19 13.90	−0.021
ε Arietis (*mean*) .	4.6	2 54 14.034	−0.0009	20 59 34.63	−0.010
ζ Arietis . .	5.0	3 9 53.856	−0.0019	20 43 21.42	−0.082
τ Arietis . .	5.2	3 16 12.091	+0.0023	20 50 2.59	−0.033
66 Arietis . .	6.1	3 23 21.265	+0.0006	+22 30 17.24	−0.112
7 Tauri . .	5.9	3 29 17.310	+0.0013	24 10 24.00	−0.023
11 Tauri . .	6.1	3 35 34.355	+0.0014	25 2 56.08	−0.008
16 Tauri . .	5.4	3 39 37.716	+0.0009	24 0 59.30	−0.049
17 Tauri . .	3.8	3 39 42.370	+0.0016	23 50 25.84	−0.050
18 Tauri . .	5.6	3 39 58.056	+0.0004	+24 34 1.57	−0.038
q Tauri . .	4.3	3 40 1.534	+0.0010	24 11 42.67	−0.034
20 Tauri . .	4.1	3 40 38.815	+0.0016	24 5 47.89	−0.044
21 Tauri . .	5.8	3 40 43.286	+0.0012	24 17 1.17	−0.046
22 Tauri . .	6.5	3 40 51.730	+0.0006	24 15 25.93	−0.039
23 Tauri . .	4.3	3 41 9.571	+0.0016	+23 40 40.76	−0.050
η Tauri . .	3.0	3 42 18.596	+0.0016	23 50 12.62	−0.050
104 B. Tauri . .	5.5	3 43 11.596	+0.0008	23 9 16.73	−0.045
27 Tauri . .	3.7	3 43 59.164	+0.0013	23 47 17.28	−0.048
28 Tauri . .	5.2	3 44 0.447	+0.0009	23 52 17.91	−0.046
14 H. Tauri . .	5.3	3 45 4.936	+0.0033	+25 19 3.84	−0.103
36 Tauri . .	5.6	3 59 9.307	+0.0001	23 52 1.59	−0.022
p Tauri . .	5.6	4 5 31.781	−0.0024	26 15 16.88	−0.042
φ Tauri . .	5.0	4 15 0.019	−0.0019	27 8 36.18	−0.082
χ Tauri . .	5.3	4 17 17.163	+0.0028	25 25 29.11	−0.029
5 B. Aurigæ . .	5.7	4 35 52.941	+0.0036	+28 26 49.66	−0.047
17 B. Aurigæ . .	6.0	4 47 20.931	+0.0033	27 45 9.83	−0.037
38 B. Aurigæ . .	6.5	4 59 11.449	−0.0001	27 34 31.05	−0.075
47 B. Aurigæ . .	6.0	5 4 17.102	. . . .	27 55 17.55	. . .
354 B. Tauri . .	6.4	5 15 31.438	−0.0027	27 52 11.83	−0.015
73 B. Aurigæ . .	5.8	5 15 40.574	+0.0004	+29 28 56.80	−0.011
22 Aurigæ . .	6.4	5 17 52.199	+0.0017	28 51 16.92	−0.031
β Tauri . .	1.8	5 20 47.470	+0.0025	28 32 5.62	−0.177
107 B. Aurigæ . .	6.5	5 30 27.878	−0.0013	27 36 22.57	−0.076
116 B. Aurigæ . .	5.9	5 33 46.348	+0.0012	29 9 57.37	−0.010
406 B. Tauri . .	5.6	5 45 29.087	−0.0013	+27 56 34.00	+0.011
136 Tauri . .	4.6	5 47 51.568	+0.0013	27 35 33.15	−0.020
154 B. Aurigæ . .	6.4	5 51 2.174	. . . .	28 55 45.63	. . .
415 B. Tauri . .	6.1	5 55 32.512	+0.0018	+27 34 7.20	−0.001

MEAN PLACES FOR 1913.0. (January $0^d.248$, Washington.)

Name of Star.	Magnitude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		h m s	s	° ′ ″	″
183 B. Aurigæ . .	6.3	6 0 49.197	. . . .	+29 31 12.75	. . .
κ Aurigæ . .	4.4	6 9 50.125	−0.0044	29 31 51.90	−0.263
211 B. Aurigæ . .	6.3	6 15 38.710	. . . .	29 34 52.49	. . .
49 Aurigæ . .	5.1	6 29 43.354	−0.0001	28 5 27.44	−0.027
53 Aurigæ . .	5.6	6 32 52.019	−0.0019	29 3 35.26	−0.022
54 Aurigæ . .	5.8	6 34 3.971	−0.0012	+28 20 26.83	−0.025
28 Geminorum .	5.5	6 39 14.766	−0.0001	29 3 35.40	−0.026
47 Geminorum .	5.6	7 5 59.431	−0.0011	27 0 1.08	−0.051
53 Geminorum .	5.9	7 10 31.268	−0.0008	28 2 58.68	−0.002
134 B. Geminorum .	6.5	7 11 40.155	+0.0058	26 50 49.34	−0.134
59 Geminorum .	5.7	7 19 8.755	+0.0010	+27 48 25.05	+0.019
ι Geminorum .	3.9	7 20 19.517	−0.0086	27 58 18.72	−0.088
b^1 Geminorum .	5.0	7 23 55.346	−0.0032	28 17 53.83	−0.063
b^2 Geminorum .	5.0	7 24 24.198	−0.0019	28 5 47.05	−0.030
υ Geminorum .	4.3	7 30 33.838	−0.0016	27 5 23.75	−0.109
c Geminorum .	5.5	7 38 48.611	−0.0017	+25 59 30.50	−0.028
κ Geminorum .	3.7	7 39 11.869	−0.0014	24 36 26.61	−0.060
φ Geminorum .	5.0	7 48 10.529	−0.0020	26 59 30.75	−0.027
ω Cancri . .	5.9	7 55 40.139	+0.0003	25 37 54.27	−0.004
5 B. Cancri . .	6.4	7 55 49.251	−0.0003	23 49 22.38	−0.047
4 Cancri . .	6.2	7 56 29.082	−0.0012	+25 19 46.94	+0.007
ψ Cancri . .	5.9	8 5 12.915	−0.0055	25 46 19.80	−0.351
35 B. Cancri . .	6.4	8 8 32.572	−0.0017	23 24 0.66	−0.022
λ Cancri . .	5.9	8 15 21.931	−0.0011	24 17 49.17	−0.028
28 Cancri . .	6.1	8 23 27.434	−0.0024	24 26 3.20	−0.072
υ^1 Cancri . .	5.7	8 26 22.034	−0.0056	+24 22 30.33	−0.069
υ^2 Cancri . .	6.4	8 27 51.702	−0.0047	24 22 52.80	−0.068
γ Cancri . .	4.7	8 38 15.247	−0.0071	21 46 55.44	−0.043
90 H.[1] Cancri . .	6.1	9 8 39.299	−0.0007	21 38 31.89	−0.013
8 Leonis . .	5.9	9 32 14.734	−0.0006	16 49 41.29	−0.015
107 B. Leonis . .	6.3	10 0 57.911	−0.0023	+16 10 53.30	+0.017
34 Leonis . .	6.4	10 6 57.661	+0.0037	13 47 6.24	−0.036
37 Leonis . .	5.5	10 12 0.664	−0.0013	14 9 45.31	−0.014
45 Leonis . .	5.8	10 23 3.380	+0.0011	10 12 22.66	−0.003
ρ Leonis . .	3.8	10 28 13.913	−0.0004	9 45 16.80	−0.003
l Leonis . .	5.3	10 44 41.160	+0.0001	+11 0 20.70	−0.033
56 Leonis . .	6.1	10 51 30.512	−0.0013	6 38 59.88	−0.008
c Leonis . .	5.1	10 56 14.289	−0.0035	6 34 8.95	−0.025
χ Leonis . .	4.7	11 0 31.820	−0.0234	7 48 24.05	−0.040
308 B. Leonis . .	5.8	11 9 30.653	+0.0032	8 32 12.82	−0.125
σ Leonis . .	4.1	11 16 39.080	−0.0062	+ 6 30 22.90	−0.013
80 Leonis . .	6.4	11 21 21.848	−0.0051	4 20 21.14	−0.050
83 Leonis . .	6.3	11 22 21.079	−0.0492	3 29 15.11	+0.187
τ Leonis . .	5.2	11 23 27.813	+0.0008	3 20 7.91	−0.016
89 Leonis . .	5.7	11 29 54.838	−0.0121	3 32 36.62	−0.104
9 B. Virginis . .	6.2	11 44 35.090	−0.0148	+ 0 9 53.53	+0.007
β Virginis . .	3.8	11 46 9.810	+0.0494	2 15 18.30	−0.275
27 B. Virginis . .	6.5	11 54 36.394	−0.0033	+ 1 0 52.25	+0.033
31 B. Virginis . .	6.4	11 56 34.536	−0.0006	− 1 16 54.99	−0.075
13 Virginis . .	5.9	12 14 12.665	+0.0019	0 18 13.14	−0.021
162 B. Virginis .	6.2	12 23 23.694	−0.0062	− 4 8 2.24	−0.003
200 B. Virginis . .	6.3	12 27 10.290	−0.0022	4 34 21.77	+0.035
f Virginis . .	6.0	12 32 18.420	−0.0021	5 21 9.06	−0.027
319 B. Virginis . .	6.3	12 43 3.564	−0.0003	− 5 49 32.70	−0.053

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Name of Star.	Magnitude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		h m s	s	° ′ ″	″
ψ Virginis	5.0	12 49 49.604	−0.0024	− 9 4 0.04	−0.028
49 Virginis	5.2	13 3 20.220	+0.0007	10 16 31.69	−0.014
g Virginis	5.6	13 4 0.221	−0.0011	8 31 6.70	−0.074
50 Virginis	6.2	13 5 12.006	+0.0003	9 51 55.78	−0.017
α Virginis	1.2	13 20 36.462	−0.0028	10 42 26.80	−0.032
i Virginis	5.7	13 22 7.248	−0.0096	−12 15 18.49	−0.023
550 B. Virginis	6.0	13 30 2.797	−0.0040	12 46 6.35	−0.014
86 Virginis	5.6	13 41 18.025	−0.0014	11 59 26.58	+0.012
621 B. Virginis	6.4	13 59 44.227	−0.0030	14 33 13.73	−0.018
214 G. Virginis	6.5	14 0 29.276	−0.0036	15 55 10.93	−0.012
40 H. Virginis	5.1	14 6 5.241	+0.0003	−15 53 29.20	−0.014
43 H. Virginis	5.5	14 10 36.261	−0.0031	17 47 42.65	−0.015
231 G. Virginis	6.4	14 12 15.011	−0.0005	18 10 53.36	+0.106
236 G. Virginis	5.7	14 13 49.452	−0.0039	18 18 47.60	−0.001
9 G. Libræ	6.5	14 29 56.871	+0.0032	20 3 28.70	−0.004
17 G. Libræ	6.4	14 41 14.621	−0.0047	−20 48 27.20	−0.121
18 G. Libræ	6.1	14 42 16.673	−0.0032	20 57 37.36	−0.014
43 B. Libræ	5.7	14 52 22.952	+0.0745	21 1 26.82	−1.793
47 G. Libræ	6.1	15 1 25.826	+0.0066	21 41 37.89	−0.050
64 G. Libræ	5.8	15 11 20.221	−0.0028	22 4 40.77	+0.018
153 B. Libræ	6.3	15 27 59.924	−0.0006	−24 11 40.39	−0.042
169 B. Libræ	6.0	15 32 40.989	−0.0017	22 51 12.56	−0.068
177 B. Libræ	6.2	15 34 14.154	−0.0016	22 51 58.52	−0.034
42 Libræ	5.0	15 35 8.103	−0.0018	23 32 9.53	−0.027
b Scorpii	4.7	15 45 44.575	−0.0024	25 29 15.41	−0.044
A Scorpii	4.6	15 48 23.130	−0.0017	−25 4 4.58	−0.023
31 B Scorpii	5.4	15 48 41.870	−0.0022	24 16 28.78	−0.037
32 B Scorpii	5.3	15 48 44.993	−0.0023	23 43 9.70	−0.016
3 Scorpii	5.9	15 49 25.894	−0.0031	24 59 11.25	−0.029
4 Scorpii	5.7	15 50 14.422	−0.0038	26 0 36.47	−0.028
40 B. Scorpii	5.4	15 53 21.609	−0.0031	−24 34 51.56	+0.004
π Scorpii	3.0	15 53 35.147	−0.0010	25 51 51.93	−0.048
48 B. Scorpii	4.9	15 58 5.010	−0.0048	25 37 24.45	−0.043
50 B. Scorpii	6.4	15 58 41.124	+0.0017	24 29 13.32	−0.032
24 G. Scorpii	6.2	16 2 38.456	0.0000	24 13 47.64	−0.068
65 B Scorpii	5.5	16 2 49.356	+0.0095	−26 5 38.31	+0.025
41 G. Scorpii	6.3	16 8 31.430	−0.0004	24 12 1.07	−0.034
85 B. Scorpii	6.0	16 9 36.948	−0.0005	25 15 24.26	+0.012
σ Scorpii	3.1	16 15 53.855	−0.0011	25 23 5.52	−0.039
α Scorpii	1.2	16 24 4.226	−0.0006	26 14 23.10	−0.028
22 Scorpii	4.8	16 24 55.190	−0.0004	−24 55 27.52	−0.016
116 B. Scorpii	6.2	16 26 2.359	−0.0013	26 20 56.34	−0.037
τ Scorpii	2.9	16 30 27.823	−0.0013	28 2 11.01	−0.034
134 B. Scorpii	6.4	16 38 53.472	+0.0012	27 17 36.80	−0.014
135 B. Scorpii	6.0	16 39 33.631	−0.0016	28 20 53.96	+0.008
118 B. Ophiuchi	6.2	17 1 29.646	−0.0008	−26 23 46.33	−0.046
95 G. Ophiuchi	6.1	17 6 58.180	+0.0008	27 39 19.07	−0.029
43 Ophiuchi	5.4	17 17 52.975	−0.0002	28 3 33.96	−0.040
163 G. Ophiuchi	6.3	17 37 49.023	+0.0002	27 50 34.60	−0.017
X Sagittarii (*var.*)	4.4	17 42 5.031	+0.0002	27 47 54.62	−0.015
10 G. Sagittarii	5.7	17 51 12.242	+0.0024	−28 3 6.30	+0.015
210 B. Scorpii	5.8	17 53 7.961	+0.0028	28 45 0.14	+0.005
W Sagittarii (*var.*)	4.3	17 59 27.759	+0.0007	29 35 5.16	−0.015
38 B. Sagittarii	4.7	18 2 34.361	+0.0016	−28 28 2.82	−0.020

MEAN PLACES FOR 1913.0. (January $0^d.248$, Washington.)

Name of Star.	Magnitude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion
		h m s	s	° ′ ″	″
C. D.—28° 14268	6.4	18 6 26.389	−0.0002	−28 55 15.25	−0.019
48 G. Sagittarii	6.3	18 11 52.946	+0.0093	28 19 1.61	−0.234
62 B. Sagittarii	6.0	18 11 53.410	+0.0053	28 40 55.11	+0.032
δ Sagittarii	2.8	18 15 25.460	+0.0023	29 51 57.63	−0.034
58 G. Sagittarii	6.1	18 16 29.911	+0.0028	28 28 13.04	+0.005
φ Sagittarii	3.3	18 40 13.269	+0.0034	−27 4 51.82	−0.006
τ Sagittarii	3.5	19 1 30.582	−0.0046	27 47 54.44	−0.254
183 B. Sagittarii	6.2	19 2 2.327	+0.0024	28 46 17.97	−0.009
201 B. Sagittarii	5.9	19 7 52.213	−0.0015	26 3 12.68	−0.018
234 B. Sagittarii	5.9	19 19 4.806	−0.0013	28 2 4.43	+0.017
248 B. Sagittarii	5.7	19 24 29.395	+0.0017	−27 9 50.74	−0.014
h Sagittarii	4.7	19 31 24.846	+0.0044	25 4 35.26	−0.027
308 B. Sagittarii	6.3	19 49 5.288	−0.0094	24 9 29.89	−0.438
ω Sagittarii	4.8	19 50 30.719	+0.0145	26 31 51.59	+0.080
A Sagittarii	4.9	19 53 39.238	+0.0013	26 25 54.26	+0.036
36 B. Capricorni	6.2	20 24 25.174	+0.0003	−22 40 50.39	−0.027
56 B. Capricorni	6.3	20 35 1.300	+0.0376	24 5 32.93	+0.462
17 Capricorni	5.8	20 41 7.492	+0.0011	21 49 51.05	−0.014
20 Capricorni	6.2	20 54 39.661	+0.0012	19 22 23.50	−0.020
η Caprioorni	4.8	20 59 27.354	−0.0025	20 11 59.18	−0.047
χ Capricorni	5.3	21 3 34.769	+0.0013	−21 32 37.48	−0.059
27 Capricorni	6.1	21 4 34.696	+0.0085	20 54 22.66	−0.123
ψ Capricorni	5.3	21 10 40.891	0.0000	21 0 48.05	0.000
30 Capricorni	5.4	21 13 4.703	+0.0015	18 21 0.79	−0.002
31 Capricorni	6.3	21 13 23.730	+0.0031	17 49 39.93	+0.006
128 B. Capricorni	6.5	21 25 6.733	+0.0019	−19 31 40.00	−0.027
γ Capricorni	3.8	21 35 16.368	+0.0129	17 3 20.57	−0.018
45 Capricorni	5.8	21 39 16.089	−0.0013	15 8 55.07	−0.002
δ Capricorni	3.0	21 42 14.441	+0.0176	16 31 21.23	−0.297
152 B. Capricorni	6.5	21 45 25.919	−0.0004	17 15 5.04	−0.054
ι Aquarii	4.4	22 1 44.392	+0.0022	−14 17 31.91	−0.062
39 Aquarii	6.2	22 7 44.369	+0.0016	14 37 21.57	−0.044
42 Aquarii	5.5	22 12 8.672	+0.0010	13 15 56.38	+0.009
45 Aquarii	6.1	22 14 20.690	+0.0051	13 44 27.12	−0.002
50 Aquarii	5.9	22 19 47.561	+0.0034	13 58 14.49	+0.013
182 B. Aquarii	6.2	22 25 22.533	+0.0129	−13 21 39.74	−0.019
σ Aquarii	4.9	22 26 2.682	0.0000	11 7 24.32	−0.026
58 Aquarii	6.4	22 27 4.671	+0.0050	11 21 5.82	−0.032
213 B. Aquarii	6.5	22 38 29.989	+0.0014	8 46 0.97	+0.031
70 Aquarii	6.1	22 43 55.668	+0.0035	11 0 54.48	+0.010
λ Aquarii	3.8	22 48 4.589	+0.0002	− 8 2 34.12	+0.035
78 Aquarii	6.3	22 50 2.330	−0.0017	7 40 2.25	−0.029
81 Aquarii	6.4	22 56 52.399	−0.0015	7 31 42.55	−0.001
82 Aquarii	6.4	22 58 1.660	0.0000	7 2 29.00	−0.034
h Aquarii	5.4	23 0 37.622	+0.0081	8 9 48.49	+0.016
φ Aquarii	4.4	23 9 49.021	+0.0015	− 6 31 5.56	−0.194
χ Aquarii	5.3	23 12 20.410	−0.0015	8 12 4.15	−0.014
96 Aquarii	5.7	23 14 53.328	+0.0128	5 35 59.29	−0.010
316 B. Aquarii	6.5	23 15 45.234	+0.0191	4 23 34.98	−0.118
317 B. Aquarii	6.3	23 16 11.833	−0.0099	6 22 59.58	−0.065
337 B. Aquarii	6.4	23 25 2.236	+0.0121	− 5 0 23.73	−0.218
342 B. Aquarii	6.5	23 27 1.926	+0.0124	4 33 46.00	−0.172
20 Piscium	5.6	23 43 28.220	+0.0064	3 14 43.26	+0.002
60 B. Piscium	6.0	23 50 19.441	−0.0023	− 0 22 28.52	−0.013

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		s	″	° ′	d h m	h m				°	°
621 B. Virginis	6.4	−0.71	− 0.4	−14 33.2	0 21 55.8	+ 2 38.7	+0.0601	0.5256	−0.2418	+43	−41
214 G. Virginis	6.5	0.73	+ 0.1	15 55.2	22 17.5	+ 2 59.7	+1.4009	0.5258	0.2413	+75	+60
40 H. Virginis	5.1	0.76	− 0.2	15 53.5	1 0 58.9	+ 5 36.0	+0.7269	0.5267	0.2378	+75	− 6
43 B. Libræ	5.7	1.03	0.8	21 1.5	22 49.5	+ 2 43.8	+1.2891	0.5360	0.2037	+69	+40
47 G. Libræ	6.1	1.08	1.0	21 41.6	2 3 0.4	+ 6 46.4	+1.1625	0.5380	0.1960	+69	+26
64 G. Libræ	5.8	−1.13	− 1.4	−22 4.7	7 33.0	+11 9.8	+0.6992	0.5401	−0.1875	+68	− 6
169 B. Libræ	6.0	1.23	2.2	22 51.2	17 13.3	− 3 29.7	−0.1966	0.5448	0.1678	+21	−56
177 B. Libræ	6.2	1.24	2.2	22 52.0	17 55.2	− 2 49.2	−0.2998	0.5451	0.1664	+16	−62
42 Libræ	5.0	1.25	2.1	23 32.2	18 19.4	− 2 25.8	+0.3464	0.5454	0.1654	+49	−25
A Scorpii	4.6	1.30	2.5	25 4.1	3 0 14.4	+ 3 16.8	+1.0397	0.5480	0.1522	+65	+18
31 B. Scorpii	5.4	−1.28	− 2.7	−24 16.5	0 22.7	+ 3 24.9	+0.1719	0.5481	−0.1519	+38	−35
32 B. Scorpii	5.3	1.28	2.8	23 43.2	0 24.1	+ 3 26.3	−0.4242	0.5481	0.1519	+ 8	−71
3 Scorpii	5.9	1.30	2.5	24 59.2	0 42.3	+ 3 43.8	+0.8825	0.5482	0.1511	+66	+ 6
40 B. Scorpii	5.4	1.31	2.8	24 34.9	2 26.8	+ 5 24.7	+0.1893	0.5490	0.1473	+39	−34
48 B. Scorpii	4.9	1.34	2.8	25 37.5	4 32.2	+ 7 25.6	+1.0005	0.5500	0.1424	+65	+15
50 B. Scorpii	6.4	−1.32	− 3.1	−24 29.3	4 48.1	+ 7 41.0	−0.2522	0.5501	−0.1419	+16	−59
24 G. Scorpii	6.2	1.33	3.3	24 13.8	6 32.7	+ 9 22.0	−0.7718	0.5508	0.1381	−12	−90
65 B. Scorpii	5.5	1.36	2.9	26 5.7	6 37.5	+ 9 26.6	+1.2114	0.5509	0.1378	+64	+35
41 G. Scorpii	6.3	1.35	3.6	24 12.1	9 7.8	+11 51.6	−1.1537	0.5519	0.1317	−39	−90
85 B. Scorpii	6.0	1.37	3.5	25 15.5	9 36.6	−11 40.6	−0.0851	0.5521	0.1306	+23	−49
σ Scorpii	3.1	−1.39	− 3.8	−25 23.2	12 21.5	− 9 1.6	−0.2985	0.5531	−0.1238	+11	−63
α Scorpii	1.2	1.43	4.0	26 14.5	15 55.2	− 5 35.4	+0.1920	0.5545	0.1153	+36	−33
22 Scorpii	4.8	1.41	4.3	24 55.5	16 17.3	− 5 14.1	−1.2624	0.5546	0.1142	−53	−90
116 B. Scorpii	6.2	1.44	4.0	26 21.0	16 46.5	− 4 45.9	+0.2118	0.5548	0.1130	+37	−32
134 B. Scorpii	6.4	1.46	4.5	27 17.7	22 20.4	+ 0 36.0	+0.6366	0.5566	0.0990	+60	− 8
118 B. Ophiuchi	6.2	−1.49	− 5.7	−26 23.9	4 8 3.4	+ 9 58.0	−1.1730	0.5591	−0.0738	−46	−90
95 G. Ophiuchi	6.1	1.52	5.8	27 39.4	10 24.0	−11 46.4	+0.0210	0.5594	0.0677	+23	−43
43 Ophiuchi	5.4	1.55	6.3	28 3.7	15 3.7	− 7 16.9	+0.1723	0.5601	−0.0551	+28	−35
				NEW	*MOON.*						
η Capricorni	4.8	−1.14	−11.9	−20 12.2	8 18 24.2	− 7 21.6	−1.3059	0.5191	+0.1808	−49	−90
χ Capricorni	5.3	1.12	12.0	21 32.8	20 27.5	− 5 22.1	+0.5589	0.5178	0.1840	+64	−14
27 Capricorni	6.1	1.12	11.9	20 54.6	20 57.4	− 4 53.2	−0.0557	0.5174	0.1847	+31	−47
φ Capricorni	5.3	1.10	12.0	21 1.0	9 0 1.3	− 1 54.9	+0.6374	0.5154	0.1894	+68	−10
128 B. Capricorni	6.5	1.04	11.7	19 31.9	7 21.9	+ 5 12.5	+0.4230	0.5105	0.2004	+59	−22
γ Capricorni	3.8	−1.01	−11.2	−17 3.5	12 36.9	+10 18.2	−1.2497	0.5072	+0.2073	−36	−90
δ Capricorni	3.0	0.98	11.0	16 31.5	16 15.3	−10 9.7	−1.0780	0.5049	0.2120	−21	−90
152 B. Capricorni	6.5	0.96	11.1	17 15.3	17 55.9	− 8 32.1	+0.0889	0.5039	0.2142	+42	−40
ι Aquarii	4.4	0.91	10.3	14 17.7	10 2 36.0	− 0 6.9	−1.2978	0.4991	0.2238	−39	−90
39 Aquarii	6.2	0.88	10.3	14 37.5	5 49.8	+ 3 1.5	−0.2012	0.4973	0.2273	+30	−56
42 Aquarii	5.5	−0.86	− 9.9	−13 16.1	8 12.8	+ 5 20.4	−1.1633	0.4961	+0.2297	−25	−90
45 Aquarii	6.1	0.84	9.9	13 44.6	9 24.6	+ 6 30.2	−0.3602	0.4955	0.2308	+22	−65
50 Aquarii	5.9	0.82	9.9	13 58.4	12 22.8	+ 9 23.4	+0.5857	0.4941	0.2335	+74	−14
182 B. Aquarii	6.2	0.80	9.6	13 21.8	15 26.5	−11 38.0	+0.6282	0.4927	0.2363	+76	−12
58 Aquarii	6.4	0.80	9.1	11 21.2	16 22.7	−10 43.3	−1.3823	0.4923	0.2370	−48	−90
70 Aquarii	6.1	−0.73	− 8.6	−11 1.1	11 1 43.7	− 1 37.5	+0.4972	0.4886	+0.2442	+70	−19
h Aquarii	5.4	0.67	7.4	8 9.9	11 6.8	+ 7 30.4	−0.3447	0.4856	0.2502	+26	−64
φ Aquarii	4.4	0.64	6.6	6 31.2	16 19.1	−11 25.6	−0.8578	0.4843	0.2530	0	−90
χ Aquarii	5.3	0.61	7.1	8 12.2	17 45.1	−10 1.9	+1.3706	0.4839	0.2538	+82	+41
96 Aquarii	5.7	0.63	6.3	5 36.1	19 12.1	− 8 37.2	−1.1437	0.4836	0.2545	−18	−90
317 B. Aquarii	6.3	−0.62	− 6.4	− 6 23.1	19 56.8	− 7 53.7	−0.0862	0.4835	+0.2548	+39	−49
337 B. Aquarii	6.4	0.58	5.7	5 0.5	12 0 59.3	− 2 59.2	−0.3206	0.4828	0.2566	+28	−62
342 B. Aquarii	6.5	0.58	5.5	4 33.9	2 7.6	− 1 52.8	−0.5189	0.4826	0.2571	+18	−75
20 Piscium	5.6	0.50	4.6	3 14.8	11 31.9	+ 7 16.6	+0.4580	0.4820	0.2598	+71	−21
80 B. Piscium	6.3	0.44	3.3	− 0 59.2	21 20.0	− 7 10.8	+0.5217	0.4822	0.2614	+76	−18
98 B. Piscium	6.3	−0.39	− 2.1	+ 1 12.3	13 4 35.2	− 0 7.0	+0.0089	0.4831	+0.2618	+45	−44

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. $\Delta\alpha$	Red'ns from 1913.0. $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		s	″	° ′	d h m	h m				°	°
44 Piscium	6.0	-0.35	- 1.7	+ 1 27.4	13 8 54.8	+ 4 5.7	+0.8630	0.4839	+0.2616	+90	0
60 Piscium	6.2	0.29	+ 0.8	6 16.0	21 15.9	- 7 53.2	-1.1790	0.4876	0.2597	-22	-84
147 B. Piscium	5.9	0.27	0.3	4 50.0	21 46.8	- 7 23.1	+0.5200	0.4878	0.2595	+75	-18
171 B. Piscium	6.3	0.21	1.2	6 0.9	14 4 9.6	- 1 10.8	+0.8810	0.4904	0.2576	+90	+ 1
ε Piscium	4.4	0.20	1.8	7 25.3	5 52.4	+ 0 29.2	-0.2111	0.4911	0.2570	+34	-55
π Piscium	5.6	-0.05	+ 4.5	+11 41.9	15 0 13.6	- 5 40.7	-0.2043	0.5017	+0.2470	+34	-53
19 Arietis	5.8	+0.15	6.7	14 52.5	18 36.1	-11 50.9	+0.7907	0.5158	0.2311	+90	+ 1
27 Arietis	6.4	0.23	8.0	17 19.3	16 3 19.6	- 3 23.9	+0.1566	0.5239	0.2206	+53	-30
μ Arietis	5.7	0.29	9.1	19 38.6	8 46.4	+ 1 52.4	-1.1184	0.5291	0.2135	-21	-71
40 Arietis	6.0	0.34	8.6	17 55.5	11 41.6	+ 4 41.9	+1.3164	0.5320	0.2091	+90	+46
47 Arietis	5.8	+0.39	+ 9.6	+20 19.4	16 5.2	+ 8 56.8	-0.3082	0.5366	+0.2024	+28	-51
ε Arietis (*mean*)	4.6	0.40	9.8	20 59.7	16 36.4	+ 9 27.0	-0.9108	0.5371	0.2017	- 6	-70
ζ Arietis	5.0	0.49	9.9	20 43.5	23 42.8	- 7 41.1	+0.7661	0.5446	0.1894	+90	+ 6
τ Arietis	5.2	0.53	10.0	20 50.2	17 2 31.1	- 4 58.7	+1.1727	0.5478	0.1841	+90	+35
66 Arietis	6.1	0.57	10.6	22 30.5	5 39.8	- 1 56.7	-0.0017	0.5512	0.1784	+44	-32
7 Tauri	5.9	+0.61	+11.2	+24 10.6	8 14.7	+ 0 32.8	-1.2856	0.5541	+0.1731	-43	-66
16 Tauri	5.4	0.68	11.2	24 1.2	12 40.8	+ 4 49.3	-0.3717	0.5589	0.1636	+24	-50
17 Tauri	3.8	0.68	11.1	23 50.6	12 42.8	+ 4 51.2	-0.1836	0.5590	0.1634	+34	-39
18 Tauri	5.6	0.68	11.4	24 34.2	12 49.5	+ 4 57.6	-0.9194	0.5592	0.1631	- 8	-66
q Tauri	4.3	0.68	11.2	24 11.9	12 51.0	+ 4 59.1	-0.5293	0.5592	0.1631	+15	-58
20 Tauri	4.1	+0.68	+11.2	+24 6.0	13 6.8	+ 5 14.3	-0.3839	0.5594	+0.1626	+23	-50
21 Tauri	5.8	0.68	11.3	24 17.2	13 8.6	+ 5 16.1	-0.5729	0.5594	0.1626	+13	-61
22 Tauri	6.5	0.68	11.3	24 15.6	13 12.2	+ 5 19.5	-0.5354	0.5595	0.1623	+15	-58
23 Tauri	4.3	0.69	11.1	23 40.9	13 19.8	+ 5 26.8	+0.0859	0.5597	0.1621	+49	-26
η Tauri	3.0	0.69	11.1	23 50.4	13 49.1	+ 5 55.1	+0.0003	0.5602	0.1610	+44	-30
104 B. Tauri	5.5	+0.70	+10.9	+23 9.5	14 11.5	+ 6 16.6	+0.7679	0.5606	+0.1602	+90	+10
27 Tauri	3.7	0.70	11.1	23 47.5	14 31.6	+ 6 36.0	+0.1644	0.5610	0.1594	+54	-22
28 Tauri	5.2	0.70	11.2	23 52.5	14 32.1	+ 6 36.5	+0.0795	0.5610	0.1594	+49	-26
36 Tauri	5.6	0.79	11.1	23 52.2	20 51.2	-11 18.6	+1.0462	0.5680	0.1448	+90	+29
p Tauri	5.6	0.84	11.8	26 15.5	23 28.1	- 8 47.5	-1.0447	0.5707	0.1384	-18	-64
χ Tauri	5.3	+0.91	+11.5	+25 25.7	18 4 13.5	- 4 13.1	+0.4410	0.5758	+0.1262	+73	- 4
17 B. Aurigæ	6.0	1.10	11.7	27 45.4	16 2.6	+ 7 7.8	-0.6356	0.5875	0.0929	+ 8	-59
38 B. Aurigæ	6.5	1.17	11.4	27 34.7	20 34.8	+11 29.0	-0.0615	0.5914	0.0796	+41	-25
47 B. Aurigæ	6.0	1.20	11.4	27 55.5	22 30.8	-10 39.8	-0.2645	0.5930	0.0735	+29	-35
354 B. Tauri	6.4	1.26	11.0	27 52.4	19 2 44.6	- 6 36.5	+0.0716	0.5964	0.0598	+49	-17
22 Aurigæ	6.4	+1.28	+11.2	+28 51.5	3 37.3	- 5 46.1	-0.8722	0.5970	+0.0571	- 7	-62
β Tauri	1.8	1.30	11.0	28 32.3	4 42.7	- 4 43.4	-0.4879	0.5979	0.0537	+17	-47
107 B. Aurigæ	6.5	1.33	10.5	27 36.6	8 18.0	- 1 17.2	+0.6209	0.6004	0.0419	+90	+14
116 B. Aurigæ	5.9	1.37	10.8	29 10.1	9 31.3	- 0 7.0	-0.9012	0.6011	0.0378	- 9	-61
406 B. Tauri	5.6	1.41	10.1	27 56.7	13 49.3	+ 4 0.0	+0.4613	0.6035	0.0231	+75	+ 7
136 Tauri	4.6	+1.42	+10.0	+27 35.7	14 41.4	+ 4 49.8	+0.8318	0.6040	+0.0203	+90	+27
154 B. Aurigæ	6.4	1.45	10.1	28 55.9	15 51.0	+ 5 56.4	-0.4884	0.6046	0.0162	+17	-45
415 B. Tauri	6.1	1.46	9.7	27 34.3	17 29.4	+ 7 30.6	+0.8980	0.6056	0.0105	+90	+32
183 B. Aurigæ	6.3	1.51	9.9	29 31.4	19 24.4	+ 9 20.7	-1.0423	0.6065	+0.0039	-21	-61
κ Aurigæ	4.4	1.55	9.5	29 32.0	22 40.2	-11 32.1	-1.0566	0.6074	-0.0075	-22	-61
211 B. Aurigæ	6.3	+1.57	+ 9.2	+29 35.0	20 0 46.0	- 9 31.7	-1.1282	0.6079	-0.0147	-29	-61
49 Aurigæ	5.1	1.60	8.3	28 5.6	5 50.1	- 4 40.7	+0.2386	0.6093	0.0324	+59	- 6
53 Aurigæ	5.6	1.63	8.3	29 3.7	6 57.8	- 3 36.1	-0.7644	0.6096	0.0366	0	-61
54 Aurigæ	5.8	1.62	8.2	28 20.6	7 23.7	- 3 11.3	-0.0652	0.6096	0.0379	+41	-22
28 Geminorum	5.5	1.65	8.0	29 3.7	9 15.3	- 1 24.6	-0.8564	0.6096	0.0446	- 6	-61
47 Geminorum	5.6	+1.70	+ 6.4	+27 0.1	18 51.6	+ 7 46.6	+0.5950	0.6094	-0.0784	+88	+ 9
53 Geminorum	5.9	1.74	6.3	28 3.1	20 29.4	+ 9 20.2	-0.5750	0.6089	0.0841	+12	-54
134 B. Geminorum	6.5	1.72	6.1	26 50.9	20 54.2	+ 9 43.8	+0.5789	0.6088	0.0853	+86	+ 8
59 Geminorum	5.7	1.75	5.8	27 48.5	23 35.9	-11 41.5	-0.6124	0.6080	0.0942	+10	-58
ι Geminorum	3.9	1.76	5.7	27 58.4	21 0 1.5	-11 17.1	-0.8156	0.6079	0.0959	- 3	-63
b^1 Geminorum	5.0	+1.77	+ 5.6	+28 18.0	1 19.5	-10 2.5	-1.2653	0.6075	-0.1003	-47	-62

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
b^2 Geminorum	5.0	+1.77	+ 5.5	+28 5.9	21 1 29.9	- 9 52.5	-1.0834	0.6074	-0.1007	-23	-62
υ Geminorum	4.3	1.76	5.1	27 5.5	3 43.7	- 7 44.5	-0.3237	0.6067	0.1084	+26	-41
c Geminorum	5.5	1.76	4.5	25 59.6	6 43 4	- 4 52.5	+0.4180	0.6058	0.1186	+71	- 4
φ Geminorum	5.0	1.79	4.0	26 59.6	10 8.5	- 1 36.2	-0.9899	0.6041	0.1292	-15	-64
ω Cancri	5.9	1.77	3.5	25 38.0	12 53.4	+ 1 1.6	-0.0199	0.6026	0.1378	+43	-27
4 Cancri	6.2	+1.77	+ 3.5	+25 19.8	13 11.4	+ 1 18.9	+0.2355	0.6024	-0.1389	+59	-15
ψ Cancri	5.9	1.78	3.0	25 46.4	16 24.6	+ 4 23.9	-0.6639	0.6007	0.1491	+ 7	-65
λ Cancri	5.9	1.77	2.3	24 17.9	20 10.9	+ 8 0.6	+0.2010	0.5985	0.1603	+56	-19
28 Cancri	6.1	1.78	1.8	24 26.1	23 12.6	+10 54.7	-0.4333	0.5963	0.1687	+21	-53
υ^1 Cancri	5.7	1.78	1.7	24 22.5	22 0 18.2	+11 57.6	-0.5621	0.5955	0.1717	+14	-60
υ^2 Cancri	6.4	+1.78	+ 1.6	+24 22.9	0 52.0	-11 30.0	-0.6656	0.5951	-0.1734	+ 8	-65
γ Cancri	4.7	1.73	+ 0.9	21 46.9	4 48.2	- 7 43.5	+1.1765	0.5923	0.1845	+90	+36
90 H^1. Cancri	6.1	1.70	- 0.9	21 38.5	16 33.7	+ 3 33.5	-1.0361	0.5829	0.2136	-15	-69
107 B. Leonis	6.3	1.52	3.5	16 10.8	23 13 46.3	- 0 2.7	-0.6805	0.5648	0.2537	+ 9	-74
34 Leonis	6.4	1.47	3.5	13 47.0	16 17.4	+ 2 22.8	+1.0259	0.5626	0.2577	+90	+15
37 Leonis	5.5	+1.46	- 3.8	+14 9.7	18 25.6	+ 4 26.3	+0.1015	0.5609	-0.2609	+50	-35
l Leonis	5.3	1.33	5.1	11 0.3	24 8 33.3	- 5 56.4	-0.6005	0.5501	0.2764	+13	-76
χ Leonis	4.7	1.23	5.2	7 48.3	15 35.8	+ 0 51.4	+0.5883	0.5453	0.2816	+81	-13
308 B. Leonis	5.8	1.23	5.9	8 32.1	19 38.5	+ 4 45.8	-1.2800	0.5427	0.2843	-31	-82
σ Leonis	4.1	1.17	5.8	6 30.3	22 52.9	+ 7 53.6	-0.1944	0.5409	0.2855	+34	-55
80 Leonis	6.4	+1.12	- 5.4	+ 4 20.3	25 1 1.9	+ 9 58.3	+1.3391	0.5397	-0.2863	+90	+36
89 Leonis	5.7	1.08	5.6	3 32.5	4 57.4	-10 14.1	+1.0023	0.5376	0.2878	+90	+ 8
β Virginis	3.8	0.99	6.0	2 15.2	12 29.6	- 2 56.9	+0.1111	0.5341	0.2887	+50	-39
27 B. Virginis	6.5	0.94	5.9	+ 1 0.8	16 26.6	+ 0 52.3	+0.2071	0.5325	0.2889	+56	-34
13 Virginis	5.9	0.86	6.5	- 0 18.3	26 1 41.5	+ 9 49.1	-1.1434	0.5296	0.2871	-17	-90
200 B. Virginis	6.3	+0.75	- 5.7	- 4 34.5	7 51.0	- 8 13.4	+1.3883	0.5281	-0.2851	+86	+43
319 B. Virginis	6.3	0.66	5.8	5 49.6	15 26.2	- 0 52.9	+0.5096	0.5271	0.2808	+75	-18
g Virginis	5.6	0.55	5.8	8 31.2	27 1 27.8	+ 8 49.5	+0.4634	0.5265	0.2733	+70	-21
α Virginis	1.2	0.44	5.6	10 42.5	9 24.6	- 7 29.0	+0.5544	0.5268	0.2660	+74	-16
86 Virginis	5.6	0.35	5.9	11 59.5	19 16.9	+ 2 4.3	-0.7039	0.5280	0.2552	+ 5	-90
214 G. Virginis	6.5	+0.21	- 5.1	-15 55.3	28 4 22.6	+10 52.2	+1.0867	0.5300	-0.2430	+75	+17
40 H. Virginis	5.1	+0.18	5.3	15 53.6	7 1.0	-10 34.5	+0.4214	0.5305	0.2394	+62	-22
43 B. Libræ	5.7	-0.07	5.1	21 1.5	29 4 33.1	+10 14.8	+1.0032	0.5375	0.2032	+69	+13
47 G. Libræ	6.1	0.13	4.9	21 41.7	8 41.6	- 9 45.0	+0.8833	0.5390	0.1955	+69	+ 5
64 G. Libræ	5.8	0.18	5.1	22 4.8	13 12.0	- 5 23.7	+0.4284	0.5407	0.1863	+55	-21
153 B. Libræ	6.3	-0.25	- 4.9	-24 11.8	20 43.1	+ 1 51.9	+1.3256	0.5436	-0.1710	+66	+53
169 B. Libræ	6.0	0.26	5.5	22 51.3	22 49.1	+ 3 53.5	-0.4504	0.5444	0.1662	+ 8	-73
177 B. Libræ	6.2	0.27	5.6	22 52.1	23 30.8	+ 4 33.9	-0.5523	0.5446	0.1646	+ 2	-81
42 Libræ	5.0	0.28	5.4	23 32.2	23 54.9	+ 4 57.1	+0.0926	0.5447	0.1638	+35	-39
A Scorpii	4.6	0.36	5.2	25 4.2	30 5 48.9	+10 38.8	+0.7938	0.5469	0.1508	+65	0
31 B. Scorpii	5.4	-0.36	- 5.5	-24 16.6	5 57.2	+10 46.8	-0.0719	0.5469	-0.1505	+26	-49
32 B. Scorpii	5.3	0.35	5.7	23 43.3	5 58.6	+10 48.2	-0.6670	0.5470	0.1503	- 5	-90
3 Scorpii	5.9	0.37	5.3	24 59.3	6 16.7	+11 5.6	+0.6374	0.5471	0.1497	+64	- 9
40 B. Scorpii	5.4	0.38	5.5	24 35.0	8 1.1	-11 13.7	-0.0512	0.5477	0.1455	+26	-47
π Scorpii	3.0	0.40	5.1	25 52.0	8 7.1	-11 7.9	+1.3029	0.5477	0.1455	+65	+51
48 B. Scorpii	4.9	-0.42	- 5.3	-25 37.5	10 6.3	- 9 12.8	+0.7619	0.5484	-0.1407	+65	- 2
50 B. Scorpii	6.4	0.41	5.7	24 29.3	10 22.2	- 8 57.5	-0.4883	0.5485	0.1401	+ 3	-77
24 G. Scorpii	6.2	0.42	5.9	24 13.9	12 6.8	- 7 16.5	-1.0042	0.5491	0.1358	-26	-90
65 B. Scorpii	5.5	0.44	5.3	26 5.7	12 11.6	- 7 11.9	+0.9761	0.5491	0.1358	+64	+13
85 B. Scorpii	6.0	0.47	5.7	25 15.5	15 10.6	- 4 19.2	-0.3135	0.5501	0.1287	+11	-64
σ Scorpii	3.1	-0.50	- 5.9	-25 23.2	17 55.7	- 1 40.0	-0.5219	0.5510	-0.1221	0	-80
α Scorpii	1.2	0.50	5.9	26 14.5	21 29.8	+ 1 46.5	-0.0259	0.5520	0.1131	+24	-46
116 B. Scorpii	6.2	0.51	5.9	26 21.0	22 21.2	+ 2 36.2	-0.0048	0.5522	0.1110	+25	-45
134 B. Scorpii	6.4	0.58	6.0	27 17.7	31 3 56.2	+ 7 59.1	+0.4302	0.5537	0.0968	+47	-20
95 G. Ophiuchi	6.1	0.69	6.6	27 39.4	16 3.2	- 4 20.0	-0.1635	0.5560	0.0652	+12	-54
43 Ophiuchi	5.4	-0.70	- 6.9	-28 3.7	20 44.7	+ 0 11.4	-0.0033	0.5565	-0.0527	+20	-45

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
163 G. Ophiuchi	6.3	−0.77	− 7.4	−27 50.7	1 5 18.3	+ 8 26.6	−0.5927	0.5568	−0.0297	−13	−88
χ Sagittarii (*var.*)	4.4	0.78	7.5	27 48.0	7 8.2	+10 12.5	−0.6915	0.5569	0.0249	−19	−90
10 G. Sagittarii	5.7	0.81	7.7	28 3.2	11 3.4	−10 0.8	−0.4929	0.5565	0.0142	− 9	−78
210 B. Scorpii	5.8	0.82	7.6	28 45.1	11 53.1	− 9 12.8	+0.2570	0.5564	0.0119	+30	−30
W Sagittarii (*var.*)	4.3	0.82	7.5	29 35.2	14 36.6	− 6 35.2	+1.1455	0.5562	0.0045	+61	+31
38 B. Sagittarii	4.7	−0.85	− 7.9	−28 28.2	15 57.0	− 5 17.8	−0.0773	0.5561	−0.0010	+11	−49
C. D.−28° 14268	6.4	0.86	7.9	28 55.4	17 37.0	− 3 41.3	+0.4200	0.5559	+0.0036	+39	−21
48 G. Sagittarii	6.3	0.87	8.1	28 19.2	19 58.0	− 1 25.4	−0.2237	0.5556	0.0097	+ 4	−58
62 B. Sagittarii	6.0	0.88	8.0	28 41.1	19 58.2	− 1 25.2	+0.1751	0.5556	0.0097	+25	−35
58 G. Sagittarii	6.1	0.86	8.2	28 28.4	21 57.8	+ 0 30.1	−0.0316	0.5551	0.0151	+15	−46
φ Sagittarii	3.3	−0.90	− 9.0	−27 5.0	2 8 16.6	+10 26.9	−1.2572	0.5526	+0.0424	−58	−90
τ Sagittarii	3.5	0.94	9.3	27 48.1	17 38.5	− 4 31.0	+0.0394	0.5492	0.0664	+23	−42
183 B. Sagittarii	6.2	0.95	9.1	28 46.5	17 52.5	− 4 17.5	+1.1254	0.5491	0.0670	+62	+28
234 B. Sagittarii	5.9	0.94	9.5	28 2.2	3 1 28.3	+ 3 2.5	+0.8968	0.5458	0.0855	+62	+ 9
248 B. Sagittarii	5.7	0.95	9.7	27 10.0	3 54.2	+ 5 23.4	+0.1534	0.5447	0.0913	+31	−36
				NEW	*MOON.*						
81 Aquarii	6.4	−0.78	− 7.9	− 7 31.8	7 15 29.4	−10 16.2	−1.4044	0.4871	+0.2513	−48	−90
k Aquarii	5.4	0.76	7.9	8 9.9	17 36.6	− 8 12.3	−0.1645	0.4864	0.2527	+35	−53
φ Aquarii	4.4	0.75	7.3	6 31.2	22 49.1	− 3 8.2	−0.6690	0.4851	0.2551	+10	−88
96 Aquarii	5.7	−0.74	− 7.0	− 5 36.1	8 1 42.2	− 0 19.6	−0.9502	0.4845	+0.2564	− 5	−90
317 B. Aquarii	6.3	0.73	7.1	6 23.1	2 26.9	+ 0 23.9	+0.1114	0.4844	0.2567	+50	−39
337 B. Aquarii	6.4	0.72	6.6	5 0.5	7 29.7	+ 5 18.7	−0.1150	0.4833	0.2589	+39	−51
342 B. Aquarii	6.5	0.72	6.4	4 33.9	8 38.2	+ 6 25.4	−0.3120	0.4832	0.2592	+29	−62
20 Piscium	5.6	0.67	5.6	3 14.8	18 3.5	− 8 24.2	+0.6828	0.4822	0.2617	+87	−10
80 B. Piscium	6.3	−0.64	− 4.4	− 0 59.2	9 3 53.6	+ 1 10.3	+0.7609	0.4822	+0.2627	+90	− 5
98 B. Piscium	6.3	0.61	3.4	+ 1 12.3	11 10.8	+ 8 16.0	+0.2549	0.4828	0.2627	+58	−32
44 Piscium	6.0	0.58	3.0	1 27.4	15 31.8	−11 29.8	+1.1184	0.4834	0.2624	+90	+15
VENUS	−4.0	....	....	4 9.9	19 5.0	− 8 2.4	−0.9392	0.4443	0.2400	− 5	−86
60 Piscium	6.2	0.55	0.9	6 16.0	10 3 58.4	+ 0 36.9	−0.9243	0.4862	0.2598	− 4	−84
62 Piscium	6.1	−0.55	− 0.8	+ 6 49.5	4 28.2	+ 1 5.8	−1.4093	0.4863	+0.2597	−47	−84
147 B. Piscium	5.9	0.52	1.3	4 50.0	4 29.6	+ 1 7.2	+0.7863	0.4863	0.2597	+90	− 4
171 B. Piscium	6.3	0.49	− 0.4	6 0.8	10 56.1	+ 7 23.3	+1.1545	0.4884	0.2573	+90	+19
δ Piscium	4.4	0.49	+ 0.1	7 25.3	12 40.0	+ 9 4.4	+0.0554	0.4891	0.2566	+47	−41
π Piscium	5.6	0.38	2.8	11 41.9	11 7 16.1	+ 3 9.4	+0.0681	0.4977	0.2460	+48	−39
19 Arietis	5.8	−0.22	+ 5.1	+14 52.4	12 1 59.2	− 2 40.2	+1.0720	0.5104	+0.2285	+90	+19
27 Arietis	6.4	0.13	6.6	17 19.3	10 54.4	+ 5 58.7	+0.4270	0.5176	0.2179	+70	−16
μ Arietis	5.7	−0.08	7.8	19 38.6	16 29.2	+11 23.0	−0.8682	0.5223	0.2106	− 3	−71
47 Arietis	5.8	+0.01	8.4	20 19.4	23 59.3	− 5 21.3	−0.0528	0.5291	0.1991	+42	−38
ε Arietis (*mean*)	4.6	0.01	8.7	20 59.7	13 0 31.4	− 4 50.2	−0.6639	0.5295	0.1983	+ 9	−70
ζ Arietis	5.0	+0.12	+ 9.0	+20 43.5	7 49.7	+ 2 13.6	+1.0301	0.5363	+0.1863	+90	+23
66 Arietis	6.1	0.20	9.9	22 30.5	13 57.1	+ 8 8.5	+0.2452	0.5424	0.1747	+59	−20
7 Tauri	5.9	0.24	10.6	24 10.6	16 36.6	+10 42.5	−1.0602	0.5450	0.1697	−18	−66
16 Tauri	5.4	0.30	10.7	24 1.2	21 10.9	− 8 52.7	−0.1379	0.5495	0.1603	+37	−36
17 Tauri	3.8	0.30	10.6	23 50.6	21 12.9	− 8 50.8	+0.0530	0.5496	0.1601	+47	−28
18 Tauri	5.6	+0.30	+10.9	+24 34.2	21 19.8	− 8 44.2	−0.6942	0.5497	+0.1598	+ 6	−66
q Tauri	4.3	0.30	10.7	24 11.9	21 21.3	− 8 42.7	−0.2983	0.5497	0.1598	+28	−46
20 Tauri	4.1	0.30	10.7	24 6.0	21 37.7	− 8 26.9	−0.1510	0.5500	0.1593	+36	−37
21 Tauri	5.8	0.30	10.8	24 17.2	21 39.6	− 8 25.0	−0.3427	0.5500	0.1593	+26	−48
22 Tauri	6.5	0.31	10.8	24 15.6	21 43.3	− 8 21.5	−0.3049	0.5501	0.1590	+28	−46
23 Tauri	4.3	+0.31	+10.6	+23 40.9	21 51.1	− 8 14.0	+0.3260	0.5502	+0.1587	+64	−13
η Tauri	3.0	0.32	10.6	23 50.4	22 21.3	− 7 44.8	+0.2384	0.5507	0.1577	+59	−18
104 B. Tauri	5.5	0.33	10.4	23 9.5	22 44.4	− 7 22.6	+1.0170	0.5510	0.1569	+90	+25
27 Tauri	3.7	0.33	10.6	23 47.5	23 5.1	− 7 2.6	+0.4043	0.5514	0.1561	+70	−10
28 Tauri	5.2	0.33	10.7	23 52.5	23 5.7	− 7 2.0	+0.3178	0.5514	0.1561	+64	−13
14 H Tauri	5.3	+0.34	+11.2	+25 19.3	23 33.7	− 6 35.0	−1.1310	0.5519	+0.1550	−25	−65

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. Δα	Red'ns from 1913.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		s	″	° ′	d h m	h m				°	°
p Tauri	5.6	+0.48	+11.7	+26 15.5	**14** 8 18.6	+ 1 50.9	−0.8354	0.5606	+0.1352	− 3	−64
φ Tauri	5.0	0.55	12.0	27 8.8	12 16.4	+ 5 39.8	−1.2439	0.5644	0.1252	−41	−63
χ Tauri	5.3	0.57	11.5	25 25.7	13 13.3	+ 6 34.6	+0.6671	0.5653	0.1228	+90	+ 8
17 B. Aurigæ	6.0	0.78	12.1	27 45.4	**15** 1 25.8	− 5 41.0	−0.4433	0.5766	0.0900	+20	−47
38 B. Aurigæ	6.5	0.87	11.9	27 34.7	6 6.9	− 1 10.9	+0.1326	0.5807	0.0767	+52	−15
47 B. Aurigæ	6.0	+0.91	+12.0	+27 55.5	8 6.7	+ 0 44.1	−0.0764	0.5822	+0.0710	+40	−25
354 B. Tauri	6.4	0.99	11.8	27 52.4	12 28.7	+ 4 55.6	+0.2578	0.5854	0.0574	+60	− 7
22 Aurigæ	6.4	1.01	12.1	28 51.5	13 23.1	+ 5 47.8	−0.7016	0.5861	0.0548	+ 4	−61
β Tauri	1.8	1.04	11.9	28 32.3	14 30.6	+ 6 52.6	−0.3133	0.5869	0.0511	+27	−36
107 B. Aurigæ	6.5	1.10	11.4	27 36.6	18 12.9	+10 25.8	+0.8061	0.5897	0.0396	+90	+24
116 B. Aurigæ	5.9	+1.12	+11.8	+29 10.1	19 28.4	+11 38.2	−0.7405	0.5904	+0.0358	+ 2	−61
406 B. Tauri	5.6	1.19	11.1	27 56.8	23 54.5	− 8 6.7	+0.6346	0.5928	0.0213	+90	+15
136 Tauri	4.6	1.20	11.0	27 35.7	**16** 0 48.2	− 7 15.3	+1.0090	0.5933	0.0185	+90	+38
154 B. Aurigæ	6.4	1.24	11.3	28 55.9	1 59.9	− 6 6.6	−0.3320	0.5939	0.0146	+26	−34
415 B. Tauri	6.1	1.26	10.7	27 34.3	3 41.3	− 4 29.4	+1.0708	0.5949	0.0086	+90	+43
183 B. Aurigæ	6.3	+1.31	+11.1	+29 31.4	5 39.8	− 2 35.8	−0.8997	0.5960	+0.0023	− 9	−61
κ Aurigæ	4.4	1.37	10.8	29 32.0	9 1.4	+ 0 37.3	−0.9194	0.5972	−0.0089	−11	−61
211 B. Aurigæ	6.3	1.41	10.6	29 35.1	11 10.8	+ 2 41.2	−0.9956	0.5979	0.0163	−17	−61
49 Aurigæ	5.1	1.48	9.6	28 5.6	16 23.4	+ 7 40.7	+0.3798	0.5995	0.0338	+69	+ 1
53 Aurigæ	5.6	1.52	9.7	29 3.7	17 33.0	+ 8 47.3	−0.6377	0.5999	0.0378	+ 8	−55
54 Aurigæ	5.8	+1.51	+ 9.5	+28 20.6	17 59.6	+ 9 12.8	+0.0693	0.6000	−0.0395	+49	−15
28 Geminorum	5.5	1.54	9.5	29 3.7	19 54.2	+11 2.5	−0.7347	0.6004	0.0460	+ 2	−61
47 Geminorum	5.6	1.66	7.7	27 0.1	**17** 5 44.7	− 3 32.1	+0.7142	0.6009	0.0793	+90	+15
53 Geminorum	5.9	1.70	7.7	28 3.1	7 24.8	− 1 56.2	−0.4707	0.6009	0.0850	+18	−48
134 B. Geminorum	6.5	1.69	7.3	26 50.9	7 50.1	− 1 32.0	+0.6937	0.6008	0.0862	+90	+14
59 Geminorum	5.7	+1.74	+ 7.2	+27 48.5	10 35.4	+ 1 6.2	−0.5140	0.6003	−0.0952	+16	−52
ι Geminorum	3.9	1.75	7.1	27 58.4	11 1.5	+ 1 31.2	−0.7201	0.6003	0.0968	+ 3	−63
b^1 Geminorum	5.0	1.78	7.0	28 18.0	12 21.1	+ 2 47.4	−1.1760	0.6000	0.1012	−33	−62
b^2 Geminorum	5.0	1.77	6.9	28 5.9	12 31.8	+ 2 57.8	−0.9929	0.6000	0.1016	−15	−62
υ Geminorum	4.3	1.78	6.3	27 5.5	14 48.3	+ 5 8.4	−0.2309	0.5996	0.1091	+32	−36
c Geminorum	5.5	+1.80	+ 5.6	+25 59.6	17 51.4	+ 8 3.8	+0.5110	0.5991	−0.1193	+79	0
φ Geminorum	5.0	1.86	5.3	26 59.6	21 20.1	+11 23.7	−0.9147	0.5979	0.1303	− 9	−64
ω Cancri	5.9	1.86	4.6	25 38.0	**18** 0 7.7	− 9 55.8	+0.0566	0.5968	0.1388	+48	−24
4 Cancri	6.2	1.86	4.5	25 19.9	0 26.0	− 9 38.2	+0.3130	0.5967	0.1395	+64	−11
ψ Cancri	5.9	1.90	4.0	25 46.4	3 42.1	− 6 30.3	−0.5983	0.5954	0.1499	+11	−61
λ Cancri	5.9	+1.90	+ 3.1	+24 17.9	7 31.4	− 2 50.6	+0.2630	0.5938	−0.1615	+60	−16
28 Cancri	6.1	1.93	2.6	24 26.1	10 35.2	+ 0 5.6	−0.3804	0.5922	0.1699	+24	−50
υ^1 Cancri	5.7	1.94	2.4	24 22.5	11 41.6	+ 1 9.3	−0.5120	0.5916	0.1729	+17	−58
υ^2 Cancri	6.4	1.94	2.3	24 22.9	12 15.7	+ 1 42.0	−0.6172	0.5912	0.1746	+11	−63
γ Cancri	4.7	1.92	+ 1.2	21 46.9	16 14.1	+ 5 30.7	+1.2218	0.5891	0.1856	+90	+40
90 H^1. Cancri	6.1	+1.98	− 0.7	+21 38.5	**19** 4 3.2	− 7 8.6	−1.0200	0.5816	−0.2155	−14	−69
107 B. Leonis	6.3	1.93	4.6	16 10.8	**20** 1 11.4	−10 49.3	−0.7104	0.5672	0.2570	+ 7	−74
34 Leonis	6.4	1.88	5.0	13 47.0	3 41.0	− 8 25.3	+0.9813	0.5654	0.2611	+90	+12
37 Leonis	5.5	1.89	5.5	14 9.7	5 47.7	− 6 23.2	+0.0569	0.5640	0.2644	+48	−37
l Leonis	5.3	1.82	7.3	11 0.2	19 43.0	+ 7 1.6	−0.6707	0.5552	0.2814	+10	−79
χ Leonis	4.7	+1.76	− 8.1	+ 7 48.3	**21** 2 37.2	−10 19.0	+0.4911	0.5514	−0.2869	+74	−19
308 B. Leonis	5.8	1.75	8.6	8 32.1	6 34.4	− 6 30.0	−1.3655	0.5492	0.2900	−40	−82
σ Leonis	4.1	1.71	8.8	6 30.2	9 44.3	− 3 26.8	−0.2985	0.5478	0.2914	+29	−61
80 Leonis	6.4	1.67	8.8	4 20.2	11 50.1	− 1 25.4	+1.2120	0.5469	0.2922	+90	+23
89 Leonis	5.7	1.65	9.1	3 32.5	15 39.6	+ 2 16.3	+0.8710	0.5452	0.2937	+90	0
β Virginis	3.8	+1.62	− 9.9	+ 2 15.1	22 59.1	+ 9 20.7	−0.0232	0.5425	−0.2951	+43	−46
27 B. Virginis	6.5	1.58	10.0	+ 1 0.7	**22** 2 49.1	−10 57.0	+0.0646	0.5413	0.2952	+48	−41
13 Virginis	5.9	1.51	10.6	− 0 18.4	11 46.5	− 2 17.8	−1.2803	0.5390	0.2937	−28	−90
162 B. Virginis	6.2	1.44	10.2	4 8.2	15 59.5	+ 1 46.7	+1.2735	0.5382	0.2923	+86	+29
200 B. Virginis	6.3	1.43	10.3	4 34.5	17 43.8	+ 3 27.5	+1.2017	0.5378	0.2917	+86	+23
f Virginis	6.0	+1.42	−10.4	− 5 21.3	20 5.6	+ 5 44.6	+1.2883	0.5375	−0.2905	+85	+31

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. Δα	Red'ns from 1913.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x*′	*y*′	N.	S.
		s	″	° ′	d h m	h m				°	°
319 B. Virginis	6.3	+1.39	−10.7	− 5 49.7	**23** 1 3.1	+10 32.1	+0.3266	0.5371	−0.2872	+63	−28
g Virginis	5.6	1.29	10.7	8 31.3	10 43.2	− 4 7.1	+0.2698	0.5367	0.2797	+59	−31
α Virginis	1.2	1.24	10.7	10 42.6	18 22.7	+ 3 17.0	+0.3516	0.5370	0.2723	+62	−27
550 B. Virginis	6.0	1.19	10.4	12 46.3	22 43.3	+ 7 28.8	+1.2575	0.5375	0.2670	+78	+29
86 Virginis	5.6	1.15	10.8	11 59.6	**24** 3 53.3	−11 31.5	−0.8925	0.5382	0.2605	− 5	−90
621 B. Virginis	6.4	+1.06	−10.4	−14 33.4	12 18.8	− 3 23.1	−0.4422	0.5397	−0.2484	+18	−71
214 G. Virginis	6.5	1.05	10.0	15 55.3	12 39.4	− 3 3.1	+0.8634	0.5398	0.2479	+75	+ 2
40 H. Virginis	5.1	1.03	10.1	15 53.7	15 12.2	− 0 35.5	+0.2085	0.5404	0.2438	+50	−34
43 B. Libræ	5.7	0.84	9.5	21 1.6	**25** 12 1.0	− 4 29.6	+0.7789	0.5458	0.2064	+69	− 2
47 G. Libræ	6.1	0.79	9.1	21 41.8	16 1.7	− 0 37.3	+0.6615	0.5470	0.1983	+69	− 9
64 G. Libræ	5.8	+0.77	− 9.2	−22 4.8	20 24.1	+ 3 36.0	+0.2142	0.5484	−0.1890	+44	−33
153 B. Libræ	6.3	0.69	8.6	24 11.8	**26** 3 42.5	+10 38.8	+1.1018	0.5505	0.1727	+66	+22
169 B. Libræ	6.0	0.67	9.1	22 51.4	5 45.1	−11 23.0	−0.6503	0.5511	0.1681	− 2	−90
177 B. Libræ	6.2	0.66	9.1	22 52.1	6 25.7	−10 43.7	−0.7504	0.5513	0.1668	− 8	−90
42 Libræ	5.0	0.66	8.9	23 32.3	6 49.2	−10 21.1	−0.1138	0.5514	0.1657	+25	−51
b Scorpii	4.7	+0.61	− 8.3	−25 29.4	11 25.5	− 5 54.7	+1.1976	0.5526	−0.1547	+65	+32
A Scorpii	4.6	0.59	8.5	25 4.2	12 34.2	− 4 48.4	+0.5812	0.5529	0.1518	+60	−13
31 B. Scorpii	5.4	0.59	8.7	24 16.6	12 42.3	− 4 40.6	−0.2738	0.5529	0.1515	+15	−61
32 B. Scorpii	5.3	0.59	8.9	23 43.3	12 43.7	− 4 39.3	−0.8616	0.5529	0.1515	−16	−90
3 Scorpii	5.9	0.59	8.5	24 59.3	13 1.4	− 4 22.2	+0.4271	0.5530	0.1509	+52	−21
40 B. Scorpii	5.4	+0.57	− 8.7	−24 35.0	14 43.2	− 2 44.1	−0.2528	0.5534	−0.1468	+16	−60
π Scorpii	3.0	0.57	8.2	25 52.0	14 49.0	− 2 38.5	+1.0847	0.5534	0.1466	+65	+21
48 B. Scorpii	4.9	0.54	8.3	25 37.5	16 45.5	− 0 46.1	+0.5521	0.5539	0.1419	+58	−14
50 B. Scorpii	6.4	0.54	8.7	24 29.4	17 1.0	− 0 31.2	−0.6834	0.5540	0.1410	− 7	−90
24 G. Scorpii	6.2	0.53	8.8	24 13.9	18 43.3	+ 1 7.5	−1.1932	0.5545	0.1370	−42	−90
65 B. Scorpii	5.5	+0.52	− 8.2	−26 5.8	18 48.0	+ 1 12.0	+0.7649	0.5545	−0.1370	+64	− 1
85 B. Scorpii	6.0	0.53	8.6	25 15.5	21 43.1	+ 4 0.8	−0.5085	0.5551	0.1293	+ 1	−79
σ Scorpii	3.1	0.49	8.6	25 23.2	**27** 0 24.8	+ 6 36.7	−0.7135	0.5556	0.1225	−10	−90
α Scorpii	1.2	0.46	8.3	26 14.5	3 54.6	+ 9 58.8	−0.2204	0.5563	0.1136	+14	−58
116 B. Scorpii	6.2	0.45	8.3	26 21.1	4 45.0	+10 47.5	−0.1993	0.5565	0.1114	+15	−57
134 B. Scorpii	6.4	+0.39	− 8.0	−27 17.7	10 13.9	− 7 55.6	+0.2352	0.5573	−0.0969	+36	−31
95 G. Ophiuchi	6.1	0.29	8.0	27 39.5	22 10.0	+ 3 34.3	−0.3448	0.5582	0.0646	+ 3	−66
43 Ophiuchi	5.4	0.24	7.9	28 3.7	**28** 2 48.0	+ 8 2.2	−0.1821	0.5581	0.0522	+10	−56
163 G. Ophiuchi	6.3	0.15	8.0	27 50.7	11 16.3	− 7 48.0	−0.7612	0.5575	0.0288	−22	−90
X Sagittarii (*var.*)	4.4	0.13	8.0	27 48.0	13 5.3	− 6 3.0	−0.8578	0.5573	0.0239	−28	−90
10 G. Sagittarii	5.7	+0.09	− 8.0	−28 3.2	16 58.6	− 2 18.2	−0.6574	0.5568	−0.0134	−18	−90
210 B. Scorpii	5.8	0.08	7.7	28 45.1	17 48.0	− 1 30.6	+0.0895	0.5567	0.0111	+21	−39
W Sagittarii (*var.*)	4.3	0.09	7.5	29 35.2	20 30.4	+ 1 5.9	+0.9761	0.5562	−0.0036	+61	+15
38 B. Sagittarii	4.7	0.07	7.8	28 28.2	21 50.4	+ 2 23.0	−0.2396	0.5558	0.0000	+ 2	−59
C. D. −28° 14268	6.4	0.06	7.7	28 55.4	23 29.8	+ 3 58.9	+0.2570	0.5554	+0.0045	+29	−30

MARCH.

Name.	Mag.	Δα	Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x*′	*y*′	N.	S.
48 G. Sagittarii	6.3	+0.03	− 7.9	−28 19.2	**1** 1 50.1	+ 6 14.1	−0.3818	0.5549	+0.0107	− 4	−69
62 B. Sagittarii	6.0	0.03	7.8	28 41.0	1 50.3	+ 6 14.3	+0.0154	0.5549	0.0107	+16	−44
58 G. Sagittarii	6.1	+0.01	− 7.8	−28 28.3	3 49.3	+ 8 9.0	−0.1885	0.5543	+0.0162	+ 7	−56
τ Sagittarii	3.5	−0.14	8.0	27 48.0	23 27.8	+ 3 5.8	−0.0981	0.5472	0.0671	+17	−50
183 B. Sagittarii	6.2	0.14	7.7	28 46.4	23 41.9	+ 3 19.4	+0.9856	0.5471	0.0677	+62	+15
234 B. Sagittarii	5.9	0.20	7.9	28 2.2	**2** 7 18.0	+10 39.6	+0.7661	0.5435	0.0867	+62	− 1
248 B. Sagittarii	5.7	0.22	8.1	27 10.0	9 44.2	−10 59.2	+0.0269	0.5423	0.0923	+25	−43
ω Sagittarii	4.8	−0.28	− 8.1	−26 32.0	21 37.9	+ 0 30.5	+0.5936	0.5358	+0.1194	+59	−11
A Sagittarii	4.9	0.29	8.1	26 26.0	23 5.3	+ 1 55.0	+0.6608	0.5349	0.1225	+63	− 8
56 B. Capricorni	6.3	0.41	8.3	24 5.7	**3** 18 45.0	− 3 3.4	+0.8896	0.5233	0.1625	+66	+ 6
17 Capricorni	5.8	0.42	8.7	21 50.0	21 43.8	− 0 10.2	−1.1262	0.5214	0.1677	−32	−90
η Capricorni	4.8	0.47	8.8	20 12.1	**4** 6 48.8	+ 8 37.9	−1.3409	0.5159	0.1836	−55	−90
χ Capricorni	5.3	−0.47	− 8.5	−21 32.8	8 53.0	+10 38.3	+0.5349	0.5147	+0.1867	+62	−16

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. Δα	Red'ns from 1913.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		s	″	° ′	d h m	h m				°	°
27 Capricorni	6.1	−0.48	− 8.6	−20 54.5	4 9 23.2	+11 7.5	−0.0790	0.5144	+0.1875	+30	−49
φ Capricorni	5.3	0.49	8.5	21 0.9	12 28.5	− 9 52.8	+0.6268	0.5126	0.1922	+67	−11
128 B. Capricorni	6.5	0.50	8.4	19 31.8	19 52.0	− 2 42.4	+0.4394	0.5084	0.2033	+59	−21
γ Capricorni	3.8	0.54	8.6	17 3.5	5 1 8.8	+ 2 25.0	−1.2165	0.5056	0.2103	−33	−90
δ Capricorni	3.0	0.55	8.6	16 31.5	4 48.1	+ 5 58.0	−1.0311	0.5036	0.2152	−18	−90
152 B. Capricorni	6.5	−0.55	− 8.4	−17 15.2	6 29.2	+ 7 36.2	+0.1443	0.5027	+0.2174	+46	−37
				NEW	*MOON.*						
60 Piscium	6.2	−0.69	− 1.9	+ 6 16.0	9 9 53.1	+ 8 18.9	−0.8344	0.4879	+0.2617	+ 1	−84
62 Piscium	6.1	0.70	1.8	6 49.5	10 22.8	+ 8 47.8	−1.3192	0.4881	0.2616	−34	−84
147 B. Piscium	5.9	−0.67	− 2.3	+ 4 50.0	10 24.2	+ 8 49.2	+0.8774	0.4881	+0.2615	+90	0
171 B. Piscium	6.3	0.66	1.4	6 0.8	16 49.5	− 8 55.9	+1.2517	0.4901	0.2592	+90	+27
ε Piscium	4.4	0.67	− 1.0	7 25.3	18 33.1	− 7 15.2	+0.1530	0.4906	0.2586	+53	−36
π Piscium	5.6	0.62	+ 1.3	11 41.8	10 13 7.6	+10 48.6	+0.1786	0.4990	0.2469	+54	−33
20 H^1. Arietis	6.4	0.57	3.9	16 49.1	11 5 59.0	+ 3 10.4	−1.3515	0.5090	0.2313	−44	−74
19 Arietis	5.8	−0.53	+ 3.6	+14 52.4	7 53.0	+ 5 1.0	+1.1956	0.5103	+0.2292	+90	+28
27 Arietis	6.4	0.47	5.0	17 19.3	16 51.0	−10 17.3	+0.5508	0.5166	0.2182	+80	−10
μ Arietis	5.7	0.45	6.0	19 38.6	22 28.2	− 4 50.6	−0.7513	0.5210	0.2103	+ 4	−71
47 Arietis	5.8	0.38	6.8	20 19.3	12 6 2.7	+ 2 29.5	+0.0705	0.5269	0.1991	+49	−31
ε Arietis (*mean*)	4.6	0.38	7.1	20 59.7	6 35.0	+ 3 0.8	−0.5455	0.5274	0.1982	+15	−64
ζ Arietis	5.0	−0.28	+ 7.6	+20 43.5	13 58.6	+10 9.9	+1.1628	0.5336	+0.1853	+90	+33
66 Arietis	6.1	0.23	8.5	22 30.4	20 11.2	− 7 50.0	+0.3710	0.5388	0.1739	+67	−13
7 Tauri	5.9	0.21	9.2	24 10.6	22 53.2	− 5 13.4	−0.9475	0.5412	0.1683	−10	−66
16 Tauri	5.4	0.14	9.4	24 1.1	13 3 32.1	− 0 44.0	−0.0169	0.5451	0.1590	+44	−31
17 Tauri	3.8	0.14	9.4	23 50.6	3 34.2	− 0 42.0	+0.1760	0.5452	0.1588	+55	−22
18 Tauri	5.6	−0.15	+ 9.6	+24 34.2	3 41.2	− 0 35.3	−0.5790	0.5453	+0.1585	+13	−61
q Tauri	4.3	0.14	9.5	24 11.9	3 42.8	− 0 33.7	−0.1789	0.5453	0.1585	+35	−39
20 Tauri	4.1	0.14	9.5	24 6.0	3 59.4	− 0 17.6	−0.0302	0.5455	0.1581	+43	−31
21 Tauri	5.8	0.14	9.5	24 17.2	4 1.4	− 0 15.7	−0.2239	0.5455	0.1581	+32	−42
22 Tauri	6.5	0.14	9.5	24 15.6	4 5.1	− 0 12.2	−0.1857	0.5456	0.1578	+34	−39
23 Tauri	4.3	−0.13	+ 9.3	+23 40.8	4 13.0	− 0 4.6	+0.4518	0.5457	+0.1576	+73	− 7
η Tauri	3.0	0.12	9.4	23 50.4	4 43.8	+ 0 25.2	+0.3630	0.5461	0.1566	+67	−12
104 B. Tauri	5.5	0.11	9.2	23 9.4	5 7.3	+ 0 47.8	+1.1505	0.5465	0.1559	+90	+35
27 Tauri	3.7	0.11	9.5	23 47.4	5 28.4	+ 1 8.2	+0.5308	0.5468	0.1551	+80	− 2
28 Tauri	5.2	0.11	9.5	23 52.5	5 29.0	+ 1 8.8	+0.4436	0.5469	0.1549	+73	− 7
14 H. Tauri	5.3	−0.11	+10.0	+25 19.2	5 57.6	+ 1 36.4	−1.0214	0.5472	+0.1542	−16	−65
p Tauri	5.6	+0.02	10.7	26 15.5	14 53.0	+10 12.8	−0.7249	0.5548	0.1336	+ 4	−64
φ Tauri	5.0	0.07	11.2	27 8.8	18 56.1	− 9 52.9	−1.1403	0.5583	0.1241	−28	−63
χ Tauri	5.3	0.09	10.6	25 25.7	19 54.3	− 8 56.8	+0.7949	0.5591	0.1216	+90	+15
17 B. Aurigæ	6.0	0.31	11.7	27 45.4	14 8 25.2	+ 3 6.0	−0.3347	0.5688	0.0889	+26	−41
38 B. Aurigæ	6.5	+0.40	+11.7	+27 34.7	13 14.2	+ 7 44.0	+0.2479	0.5721	+0.0753	+60	− 9
47 B. Aurigæ	6.0	0.44	11.8	27 55.5	15 17.5	+ 9 42.5	+0.0348	0.5735	0.0695	+47	−19
354 B. Tauri	6.4	0.51	11.8	27 52.4	19 47.4	− 9 58.0	+0.3723	0.5765	0.0564	+68	0
22 Aurigæ	6.4	0.53	12.1	28 51.5	20 43.4	− 9 4.3	−0.6021	0.5770	0.0535	+10	−54
β Tauri	1.8	0.55	12.0	28 32.3	21 53.0	− 7 57.4	−0.2084	0.5777	0.0502	+33	−30
107 B. Aurigæ	6.5	+0.62	+11.6	+27 36.6	15 1 42.2	− 4 17.2	+0.9268	0.5798	+0.0386	+90	+31
116 B. Aurigæ	5.9	0.65	12.1	29 10.2	3 0.2	− 3 2.3	−0.6451	0.5805	0.0345	+ 8	−56
406 B. Tauri	5.6	0.74	11.5	27 56.8	7 35.1	+ 1 21.6	+0.7502	0.5829	0.0206	+90	+22
136 Tauri	4.6	0.75	11.3	27 35.7	8 30.6	+ 2 14.9	+1.1301	0.5832	0.0176	+90	+47
154 B. Aurigæ	6.4	0.79	11.8	28 56.0	9 44.7	+ 3 26.1	−0.2335	0.5837	0.0138	+31	−28
415 B. Tauri	6.1	+0.81	+11.2	+27 34.3	11 29.5	+ 5 6.6	+1.1918	0.5843	+0.0081	+90	+53
183 B. Aurigæ	6.3	0.87	11.8	29 31.4	13 32.1	+ 7 4.3	−0.8126	0.5851	+0.0016	− 3	−61
κ Aurigæ	4.4	0.94	11.5	29 32.1	17 0.7	+10 24.4	−0.8344	0.5863	−0.0094	− 5	−61
211 B. Aurigæ	6.3	0.96	11.5	29 35.1	19 14.7	−11 27.0	−0.9137	0.5871	0.0163	−10	−61
49 Aurigæ	5.1	1.06	10.6	28 5.6	16 0 38.5	− 6 16.4	+0.4823	0.5880	0.0337	+77	+ 6
53 Aurigæ	5.6	+1.09	+10.8	+29 3.8	1 50.6	− 5 7.3	−0.5531	0.5882	−0.0375	+13	−50

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
54 Aurigæ	5.8	+1.09	+10.5	+28 20.6	16 2 18.1	− 4 40.9	+0.1658	0.5883	−0.0391	+55	− 9
28 Geminorum	5.5	1.14	10.6	29 3.8	4 16.8	− 2 47.1	−0.6534	0.5886	0.0453	+ 7	−57
47 Geminorum	5.6	1.30	8.9	27 0.2	14 29.2	+ 7 0.3	+0.8145	0.5889	0.0784	+90	+21
53 Geminorum	5.9	1.35	9.1	28 3.1	16 13.0	+ 8 39.9	−0.3922	0.5889	0.0838	+23	−43
134 B. Geminorum	6.5	1.34	8.6	26 51.0	16 39.3	+ 9 5.0	+0.7923	0.5889	0.0853	+90	+19
59 Geminorum	5.7	+1.39	+ 8.6	+27 48.6	19 30.7	+11 49.4	−0.4385	0.5887	−0.0941	+20	−47
ι Geminorum	3.9	1.40	8.6	27 58.5	19 57.7	−11 44.6	−0.6480	0.5886	0.0955	+ 8	−60
b^1 Geminorum	5.0	1.43	8.6	28 18.0	21 20.3	−10 25.4	−1.1130	0.5883	0.1000	−26	−62
b^2 Geminorum	5.0	1.43	8.5	28 5.9	21 31.4	−10 14.8	−0.9266	0.5882	0.1003	−10	−62
υ Geminorum	4.3	1.46	7.9	27 5.5	23 52.9	− 7 59.1	−0.1531	0.5877	0.1077	+36	−32
c Geminorum	5.5	+1.49	+ 7.1	+25 59.6	17 3 2.8	− 4 56.8	+0.5992	0.5871	−0.1174	+88	+ 5
φ Geminorum	5.0	1.57	7.0	26 59.6	6 39.2	− 1 29.2	−0.8531	0.5863	0.1285	− 5	−64
ω Cancri	5.9	1.59	6.1	25 38.0	9 32.8	+ 1 17.4	+0.1327	0.5854	0.1368	+52	−20
4 Cancri	6.2	1.59	6.0	25 19.9	9 51.8	+ 1 35.6	+0.3931	0.5852	0.1379	+69	− 7
ψ Cancri	5.9	1.65	5.6	25 46.4	13 15.0	+ 4 50.7	−0.5362	0.5840	0.1475	+15	−57
λ Cancri	5.9	+1.68	+ 4.6	+24 17.9	17 12.3	+ 8 38.4	+0.3365	0.5826	−0.1590	+65	−12
28 Cancri	6.1	1.72	4.3	24 26.1	20 22.5	+11 41.0	−0.3196	0.5813	0.1679	+27	−47
$υ^1$ Cancri	5.7	1.73	4.1	24 22.6	21 31.2	−11 13.0	−0.4542	0.5807	0.1707	+20	−54
$υ^2$ Cancri	6.4	1.74	4.0	24 22.9	22 6.5	−10 39.1	−0.5613	0.5805	0.1723	+14	−60
γ Cancri	4.7	1.74	2.6	21 47.0	18 2 12.8	− 6 42.5	+1.3026	0.5785	0.1830	+90	+50
90 H^1. Cancri	6.1	+1.88	+ 0.7	+21 38.5	14 24.2	+ 5 0.5	−0.9817	0.5723	−0.2128	−11	−69
107 B. Leonis	6.3	1.95	− 3.9	16 10.8	19 12 4.9	+ 1 52.4	−0.6852	0.5606	0.2551	+ 9	−74
34 Leonis	6.4	1.92	4.8	13 47.0	14 37.6	+ 4 19.5	+1.0200	0.5593	0.2592	+90	+14
37 Leonis	5.5	1.94	5.0	14 9.7	16 46.8	+ 6 24.1	+0.0850	0.5582	0.2626	+49	−36
l Leonis	5.3	1.96	7.5	11 0.2	20 6 55.1	− 3 58.0	−0.6607	0.5516	0.2806	+11	−79
χ Leonis	4.7	+1.92	− 8.8	+ 7 48.3	13 53.5	+ 2 45.7	+0.5001	0.5489	−0.2866	+74	−18
308 B. Leonis	5.8	1.95	9.2	8 32.1	17 52.5	+ 6 36.4	−1.3662	0.5475	0.2899	−40	−82
σ Leonis	4.1	1.93	9.8	6 30.2	21 3.4	+ 9 40.7	−0.2992	0.5465	0.2917	+29	−61
80 Leonis	6.4	1.90	10.2	4 20.2	23 9.8	+11 42.7	+1.2123	0.5459	0.2927	+90	+25
89 Leonis	5.7	1.90	10.7	3 32.4	21 2 59.8	− 8 35.2	+0.8666	0.5449	0.2944	+90	0
β Virginis	3.8	+1.90	−11.6	+ 2 15.1	10 19.1	− 1 31.0	−0.0355	0.5433	−0.2965	+43	−47
27 B. Virginis	6.5	1.88	11.9	+ 1 0.7	14 8.2	+ 2 10.3	+0.0489	0.5427	0.2968	+47	−42
13 Virginis	5.9	1.87	12.8	− 0 18.4	23 2.0	+10 46.0	−1.2984	0.5418	0.2960	−30	−90
162 B. Virginis	6.2	1.83	13.1	4 8.3	22 3 12.5	− 9 12.0	+1.2417	0.5416	0.2948	+86	+26
200 B. Virginis	6.3	1.83	13.2	4 34.6	4 55.6	− 7 32.4	+1.1682	0.5416	0.2943	+86	+20
f Virginis	6.0	+1.82	−13.3	− 5 21.4	7 15.7	− 5 17.0	+1.2517	0.5415	−0.2936	+85	+27
319 B. Virginis	6.3	1.81	13.6	5 49.8	12 9.0	− 0 33.7	+0.2917	0.5418	0.2905	+61	−30
g Virginis	5.6	1.78	14.0	8 31.3	21 39.0	+ 8 37.0	+0.2281	0.5426	0.2835	+56	−33
50 Virginis	6.2	1.77	13.9	9 52.2	22 11.5	+ 9 8.3	+1.4122	0.5427	0.2829	+81	+49
α Virginis	1.2	1.75	14.2	10 42.7	23 5 8.8	− 8 8.7	+0.3044	0.5438	0.2761	+59	−29
550 B. Virginis	6.0	+1.73	−14.0	−12 46.3	9 23.5	− 4 2.8	+1.1987	0.5447	−0.2712	+78	+24
86 Virginis	5.6	1.72	14.3	11 59.7	14 25.9	+ 0 49.3	−0.9311	0.5460	0.2646	− 7	−90
621 B. Virginis	6.4	1.69	14.2	14 33.5	22 38.0	+ 8 44.2	−0.4889	0.5482	0.2528	+15	−74
214 G. Virginis	6.5	1.69	14.0	15 55.4	22 57.9	+ 9 3.5	+0.8011	0.5483	0.2522	+75	− 2
40 H. Virginis	5.1	1.68	14.0	15 53.7	24 1 26.5	+11 26.9	+0.1531	0.5491	0.2481	+47	−37
43 B. Libræ	5.7	+1.61	−13.5	−21 1.7	21 37.5	+ 6 55.0	+0.7096	0.5556	−0.2104	+69	− 6
47 G. Libræ	6.1	1.57	12.9	21 41.8	25 1 30.6	+10 39.5	+0.5932	0.5568	0.2020	+66	−13
64 G. Libræ	5.8	1.55	12.7	22 4.9	5 44.6	− 9 15.7	+0.1516	0.5582	0.1926	+41	−36
153 B. Libræ	6.3	1.51	12.0	24 11.9	12 48.8	− 2 26.9	+1.0259	0.5603	0.1757	+66	+15
169 B. Libræ	6.0	1.49	12.3	22 51.4	14 47.5	− 0 32.6	−0.7011	0.5608	0.1711	− 5	−90
177 B. Libræ	6.2	+1.48	−12.3	−22 52.2	15 26.7	+ 0 5.1	−0.7998	0.5610	−0.1693	−11	−90
42 Libræ	5.0	1.48	12.1	23 32.4	15 49.5	+ 0 27.1	−0.1725	0.5612	0.1684	+22	−55
b Scorpii	4.7	1.48	11.5	25 29.4	20 17.0	+ 4 44.7	+1.1199	0.5623	0.1575	+65	+24
A Scorpii	4.6	1.47	11.6	25 4.3	21 23.5	+ 5 48.8	+0.5125	0.5625	0.1546	+56	−16
31 B. Scorpii	5.4	1.47	11.8	24 16.7	21 31.3	+ 5 56.3	−0.3304	0.5626	0.1543	+12	−65
32 B. Scorpii	5.3	+1.47	−12.0	−23 43.4	21 32.6	+ 5 57.5	−0.9095	0.5626	−0.1543	−19	−90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x′	y′	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
3 Scorpii	5.9	+1.47	−11.6	−24 59.4	25 21 49.8	+ 6 14.1	+0.3605	0.5627	−0.1534	+48	−25
40 B. Scorpii	5.4	1.45	11.6	24 35.1	23 28.4	+ 7 49.1	−0.3095	0.5630	0.1493	+13	−63
π Scorpii	3.0	1.46	11.3	25 52.1	23 34.1	+ 7 54.6	+1.0090	0.5630	0.1490	+65	+15
48 B. Scorpii	4.9	1.44	11.3	25 37.6	26 1 26.8	+ 9 43.0	+0.4838	0.5634	0.1440	+54	−18
50 B. Scorpii	6.4	1.44	11.6	24 29.4	1 41.9	+ 9 57.6	−0.7342	0.5635	0.1434	− 9	−90
24 G. Scorpii	6.2	+1.42	−11.6	−24 14.0	3 20.9	+11 32.9	−1.2365	0.5638	−0.1390	−47	−90
65 B. Scorpii	5.5	1.43	11.1	26 5.8	3 25.4	+11 37.3	+0.6939	0.5638	0.1390	+64	− 6
85 B. Scorpii	6.0	1.40	11.2	25 15.6	6 15.1	− 9 39.4	−0.5617	0.5645	0.1316	− 1	−84
σ Scorpii	3.1	1.38	11.0	25 23.3	8 51.8	− 7 8.5	−0.7637	0.5648	0.1244	−13	−90
α Scorpii	1.2	1.35	10.6	26 14.6	12 15.2	− 3 52.8	−0.2773	0.5652	0.1152	+11	−62
116 B. Scorpii	6.2	+1.35	−10.6	−26 21.1	13 4.1	− 3 5.8	−0.2562	0.5653	−0.1129	+12	−60
134 B. Scorpii	6.4	1.30	10.0	27 17.8	18 23.2	+ 2 1.4	+0.1727	0.5659	0.0984	+33	−35
135 B. Scorpii	6.0	1.31	9.7	28 21.1	18 39.8	+ 2 17.4	+1.2552	0.5660	0.0978	+62	+45
95 G. Ophiuchi	6.1	1.22	9.4	27 39.5	27 5 59.2	−10 48.7	−0.3984	0.5659	0.0655	0	−70
43 Ophiuchi	5.4	1.18	9.0	28 3.7	10 30.0	− 6 28.1	−0.2371	0.5654	0.0528	+ 8	−59
163 G. Ophiuchi	6.3	+1.09	− 8.6	−27 50.7	18 45.7	+ 1 29.1	−0.8084	0.5642	−0.0290	−25	−90
X Sagittarii (*var.*)	4.4	1.11	8.5	27 48.1	20 32.2	+ 3 11.6	−0.9036	0.5637	0.0240	−31	−90
10 G. Sagittarii	5.7	1.07	8.2	28 3.2	28 0 20.3	+ 6 51.2	−0.7050	0.5626	0.0131	−20	−90
210 B. Scorpii	5.8	1.07	7.9	28 45.1	1 8.6	+ 7 37.6	+0.0337	0.5624	0.0111	+17	−43
W Sagittarii (*var.*)	4.3	1.04	7.5	29 35.2	3 47.5	+10 10.6	+0.9110	0.5617	−0.0036	+61	+10
38 B. Sagittarii	4.7	+1.02	− 7.8	−28 28.2	5 5.7	+11 25.9	−0.2911	0.5613	+0.0001	0	−63
C. D. −28° 14268	6.4	1.00	7.5	28 55.4	6 43.2	−11 0.2	+0.2005	0.5608	0.0049	+26	−33
48 G. Sagittarii	6.3	0.97	7.7	28 19.2	9 0.6	− 8 47.8	−0.4311	0.5599	0.0111	− 6	−73
62 B. Sagittarii	6.0	0.98	7.5	28 41.0	9 0.8	− 8 47.6	−0.0383	0.5599	0.0111	+14	−47
δ Sagittarii	2.8	0.97	7.0	29 52.1	10 30.3	− 7 21.4	+1.2578	0.5593	0.0151	+61	+50
58 G. Sagittarii	6.1	+0.95	− 7.5	−28 28.3	10 57.5	− 6 55.2	−0.2392	0.5591	+0.0164	+ 4	−59
τ Sagittarii	3.5	0.76	6.5	27 48.0	29 6 16.9	+11 42.4	−0.1457	0.5501	0.0679	+14	−53
183 B. Sagittarii	6.2	0.77	6.2	28 46.4	6 30.8	+11 55.8	+0.9294	0.5500	0.0686	+62	+11
234 B. Sagittarii	5.9	0.68	6.0	28 2.2	14 1.4	− 4 49.4	+0.7140	0.5455	0.0871	+62	− 4
248 B. Sagittarii	5.7	0.65	6.1	27 9.9	16 26.0	− 2 29.8	−0.0194	0.5440	0.0930	+23	−46
ω Sagittarii	4.8	+0.55	− 5.6	−26 32.0	30 4 13.2	+ 8 53.3	+0.5474	0.5365	+0.1200	+56	−14
A Sagittarii	4.9	0.53	5.6	26 26.0	5 40.0	+10 17.1	+0.6148	0.5356	0.1232	+60	−10
56 B. Capricorni	6.3	0.35	5.1	24 5.6	31 1 13.8	+ 5 12.9	+0.8492	0.5226	0.1622	+66	+ 3
17 Capricorni	5.8	0.29	5.7	21 49.9	4 12.2	+ 8 5.7	−1.1580	0.5206	0.1677	−34	−90
χ Capricorni	5.3	0.19	5.2	21 32.7	15 20.4	− 5 6.8	+0.5005	0.5135	0.1865	+60	−18
27 Capricorni	6.1	+0.18	− 5.4	−20 54.5	15 50.6	− 4 37.5	−0.1114	0.5132	+0.1873	+29	−51
φ Capricorni	5.3	+0.18	− 5.1	−21 0.9	18 55.8	− 1 37.9	+0.5935	0.5112	+0.1924	+66	−13

APRIL.

128 B. Capricorni	6.5	+0.11	− 5.1	−19 31.8	1 2 19.2	+ 5 32.3	+0.4089	0.5070	+0.2028	+58	−23
γ Capricorni	3.8	0.04	5.5	17 3.4	7 36.1	+10 39.8	−1.2419	0.5039	0.2102	−35	−90
δ Capricorni	3.0	+0.01	5.4	16 31.4	11 15.7	− 9 46.8	−1.0561	0.5020	0.2147	−20	−90
152 B. Capricorni	6.5	0.00	5.1	17 15.2	12 56.8	− 8 8.7	+0.1172	0.5011	0.2168	+44	−38
ι Aquarii	4.4	−0.07	5.3	14 17.6	21 39.3	+ 0 19.0	−1.2342	0.4969	0.2269	−31	−90
39 Aquarii	6.2	−0.09	− 5.0	−14 37.4	2 0 53.8	+ 3 27.9	−0.1255	0.4955	+0.2302	+33	−52
42 Aquarii	5.5	0.11	5.2	13 16.0	3 17.4	+ 5 47.5	−1.0777	0.4945	0.2327	−18	−90
45 Aquarii	6.1	0.12	5.0	13 44.5	4 29.3	+ 6 57.4	−0.2702	0.4940	0.2339	+27	−60
50 Aquarii	5.9	0.13	4.8	13 58.3	7 28.0	+ 9 51.1	+0.6863	0.4928	0.2369	+77	− 9
182 B. Aquarii	6.2	0.16	4.8	13 21.7	10 32.0	−11 10.0	+0.7405	0.4917	0.2396	+77	− 6
58 Aquarii	6.4	−0.18	− 5.2	−11 21.2	11 28.3	−10 15.2	−1.2650	0.4914	+0.2403	−32	−90
70 Aquarii	6.1	0.22	4.5	11 1.0	20 49.7	− 1 9.1	+0.6479	0.4884	0.2479	+79	−11
81 Aquarii	6.4	0.29	4.8	7 31.8	3 4 5.4	+ 5 54.9	−1.4002	0.4867	0.2528	−47	−90
h Aquarii	5.4	0.30	4.5	8 9.9	6 12.3	+ 7 58.4	−0.1595	0.4861	0.2542	+36	−53
φ Aquarii	4.4	0.34	4.5	6 31.2	11 24.0	−10 58.2	−0.6548	0.4854	0.2568	+11	−87
96 Aquarii	5.7	−0.36	− 4.4	− 5 36.1	14 16.6	− 8 10.3	−0.9307	0.4850	+0.2583	− 4	−90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
317 B. Aquarii	6.3	−0.36	− 4.3	− 6 23.1	8 15 1.1	− 7 26.9	+0.1292	0.4849	+0.2586	+51	−38
337 B. Aquarii	6.4	0.38	4.0	5 0.5	20 2.6	− 2 33.4	−0.0892	0.4844	0.2609	+40	−49
342 B. Aquarii	6.5	−0.39	− 4.0	− 4 33.8	21 10.8	− 1 27.0	−0.2837	0.4843	+0.2612	+30	−60
				NEW	*MOON.*						
μ Arietis	5.7	−0.63	+ 4.6	+19 38.6	8 4 10.3	+ 2 39.0	−0.7659	0.5245	+0.2115	+ 3	−71
47 Arietis	5.8	0.58	5.4	20 19.3	11 41.0	+ 9 55.2	+0.0528	0.5303	0.1998	+48	−32
ε Arietis (*mean*)	4.6	0.59	5.6	20 59.7	12 13.1	+10 26.3	−0.5621	0.5308	0.1988	+15	−65
ζ Arietis	5.0	0.54	6.1	20 43.5	19 33.4	− 6 27.9	+1.1431	0.5367	0.1864	+90	+31
66 Arietis	6.1	0.50	7.0	22 30.4	9 1 43.9	− 0 29.8	+0.3511	0.5416	0.1745	+66	−14
7 Tauri	5.9	−0.50	+ 7.5	+24 10.5	4 25.1	+ 2 5.8	−0.9683	0.5439	+0.1691	−11	−66
16 Tauri	5.4	0.45	7.9	24 1.1	9 2.8	+ 6 34.0	−0.0382	0.5475	0.1596	+43	−32
17 Tauri	3.8	0.44	7.9	23 50.6	9 4.9	+ 6 36.0	+0.1548	0.5475	0.1596	+54	−22
18 Tauri	5.6	0.45	8.0	24 34.2	9 11.8	+ 6 42.6	−0.6008	0.5476	0.1593	+12	−62
q Tauri	4.3	0.45	7.9	24 11.8	9 13.4	+ 6 44.2	−0.2004	0.5477	0.1591	+34	−40
20 Tauri	4.1	−0.44	+ 7.9	+24 5.9	9 30.0	+ 7 0.3	−0.0515	0.5479	+0.1585	+42	−32
21 Tauri	5.8	0.45	8.0	24 17.2	9 31.9	+ 7 2.1	−0.2456	0.5479	0.1585	+31	−42
22 Tauri	6.5	0.45	8.0	24 15.6	9 35.7	+ 7 5.7	−0.2074	0.5480	0.1583	+33	−41
23 Tauri	4.3	0.44	7.9	23 40.8	9 43.6	+ 7 13.3	+0.4305	0.5481	0.1580	+72	− 8
η Tauri	3.0	0.43	8.0	23 50.3	10 14.2	+ 7 42.9	+0.3417	0.5484	0.1569	+66	−12
104 B. Tauri	5.5	−0.42	+ 7.8	+23 9.4	10 37.7	+ 8 5.5	+1.1293	0.5487	+0.1561	+90	+34
27 Tauri	3.7	0.42	8.0	23 47.4	10 58.7	+ 8 25.8	+0.5096	0.5490	0.1553	+78	− 4
28 Tauri	5.2	0.43	8.0	23 52.4	10 59.3	+ 8 26.4	+0.4220	0.5490	0.1553	+71	− 9
14 H. Tauri	5.3	0.43	8.4	25 19.2	11 27.7	+ 8 53.8	−1.0440	0.5494	0.1543	−17	−65
p Tauri	5.6	0.35	9.2	26 15.4	20 22.2	− 6 30.7	−0.7499	0.5563	0.1338	+ 2	−64
φ Tauri	5.0	−0.30	+ 9.7	+27 8.7	10 0 25.2	− 2 36.4	−1.1673	0.5592	+0.1239	−30	−63
χ Tauri	5.3	0.27	9.3	25 25.6	1 23.4	− 1 40.4	+0.7723	0.5600	0.1216	+90	+14
17 B. Aurigæ	6.0	0.11	10.6	27 45.3	13 56.4	+10 24.7	−0.3632	0.5685	0.0885	+24	−43
38 B. Aurigæ	6.5	0.03	10.7	27 34.7	18 47.0	− 8 55.8	+0.2211	0.5715	0.0754	+58	−10
47 B. Aurigæ	6.0	−0.01	10.8	27 55.5	20 51.1	− 6 56.5	+0.0067	0.5726	0.0691	+45	−21
354 B. Tauri	6.4	+0.06	+10.9	+27 52.4	11 1 23.2	− 2 34.9	+0.3455	0.5748	+0.0561	+66	− 2
22 Aurigæ	6.4	0.07	11.3	28 51.5	2 19.7	− 1 40.6	−0.6353	0.5753	0.0533	+ 8	−57
β Tauri	1.8	0.10	11.1	28 32.3	3 29.9	− 0 33.1	−0.2395	0.5758	0.0498	+31	−32
107 B. Aurigæ	6.5	0.16	10.9	27 36.6	7 21.6	+ 3 9.5	+0.9030	0.5777	0.0385	+90	+29
116 B. Aurigæ	5.9	0.18	11.4	29 10.1	8 40.5	+ 4 25.3	−0.6801	0.5781	0.0345	+ 5	−59
406 B. Tauri	5.6	+0.27	+11.1	+27 56.8	13 18.7	+ 8 52.6	+0.7248	0.5796	+0.0202	+90	+21
136 Tauri	4.6	0.29	10.9	27 35.7	14 14.9	+ 9 46.5	+1.1074	0.5799	0.0172	+90	+45
154 B. Aurigæ	6.4	0.31	11.4	28 56.0	15 30.0	+10 58.7	−0.2672	0.5803	0.0136	+29	−30
415 B. Tauri	6.1	0.34	10.9	27 34.3	17 16.4	−11 19.1	+1.1698	0.5809	0.0081	+90	+51
183 B. Aurigæ	6.3	0.37	11.5	29 31.4	19 20.8	− 9 19.6	−0.8519	0.5815	+0.0018	− 6	−61
κ Aurigæ	4.4	+0.43	+11.4	+29 32.1	22 52.8	− 5 56.0	−0.8750	0.5820	−0.0091	− 7	−61
211 B. Aurigæ	6.3	0.48	11.4	29 35.1	12 1 9.2	− 3 45.1	−0.9557	0.5823	0.0162	−13	−61
49 Aurigæ	5.1	0.57	10.7	28 5.6	6 39.0	+ 1 31.6	+0.4533	0.5831	0.0335	+75	+ 5
53 Aurigæ	5.6	0.60	11.0	29 3.8	7 52.6	+ 2 42.2	−0.5933	0.5831	0.0372	+11	−52
54 Aurigæ	5.8	0.61	10.7	28 20.6	8 20.6	+ 3 9.1	+0.1331	0.5830	0.0387	+53	−11
28 Geminorum	5.5	+0.65	+10.9	+29 3.8	10 21.8	+ 5 5.4	−0.6953	0.5829	−0.0450	+ 5	−60
47 Geminorum	5.6	0.82	9.6	27 0.2	20 48.2	− 8 53.2	+0.7885	0.5821	0.0773	+90	+19
53 Geminorum	5.9	0.86	9.8	28 3.1	22 34.6	− 7 11.0	−0.4334	0.5817	0.0827	+20	−45
134 B. Geminorum	6.5	0.86	9.3	26 51.0	23 1.6	− 6 45.1	+0.7661	0.5816	0.0842	+90	+17
59 Geminorum	5.7	0.92	9.5	27 48.6	13 1 57.4	− 3 56.4	−0.4806	0.5810	0.0929	+18	−50
ι Geminorum	3.9	+0.93	+ 9.5	+27 58.5	2 25.2	− 3 29.6	−0.6934	0.5809	−0.0943	+ 5	−63
b^1 Geminorum	5.0	0.96	9.5	28 18.1	3 50.0	− 2 8.2	−1.1644	0.5805	0.0987	−31	−62
b^2 Geminorum	5.0	0.96	9.4	28 5.9	4 1.3	− 1 57.3	−0.9759	0.5805	0.0990	−14	−62
υ Geminorum	4.3	1.00	8.8	27 5.5	6 26.8	+ 0 22.4	−0.1924	0.5800	0.1066	+34	−34
c Geminorum	5.5	1.04	8.1	25 59.6	9 42.0	+ 3 29.9	+0.5703	0.5788	0.1159	+85	+ 4
φ Geminorum	5.0	+1.12	+ 8.1	+26 59.6	13 24.7	+ 7 3.8	−0.9026	0.5775	−0.1266	− 8	−64

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
ω Cancri	5.9	+1.16	+ 7.4	+25 38.0	**13** 16 23.6	+ 9 55.7	+0.0967	0.5764	-0.1348	+50	-22
4 Cancri	6.2	1.16	7.2	25 19.9	16 43.2	+10 14.5	+0.3608	0.5763	0.1358	+67	- 9
ψ Cancri	5.9	1.21	6.9	25 46.4	20 12.7	-10 24.1	-0.5820	0.5749	0.1455	+12	-59
λ Cancri	5.9	1.25	6.1	24 17.9	**14** 0 17.6	- 6 28.8	+0.3035	0.5730	0.1562	+63	-13
28 Cancri	6.1	1.31	5.7	24 26.1	3 34.0	- 3 19.9	-0.3629	0.5715	0.1651	+25	-49
υ^1 Cancri	5.7	+1.33	+ 5.6	+24 22.6	4 45.0	- 2 11.6	-0.4996	0.5710	-0.1679	+17	-57
υ^2 Cancri	6.4	1.34	5.5	24 23.0	5 21.4	- 1 36.6	-0.6084	0.5707	0.1695	+11	-63
γ Cancri	4.7	1.37	4.0	21 47.0	9 36.2	+ 2 28.5	+1.2847	0.5686	0.1801	+90	+48
90 H^1. Cancri	6.1	1.53	+ 2.4	21 38.6	22 13.1	- 9 23.0	-1.0356	0.5619	0.2089	-15	-69
107 B. Leonis	6.3	1.71	- 2.3	16 10.8	**15** 20 40.3	-11 44.3	-0.7308	0.5505	0.2505	+ 6	-74
34 Leonis	6.4	+1.70	- 3.4	+13 47.0	23 18.4	- 9 11.8	+1.0025	0.5493	-0.2543	+90	+13
37 Leonis	5.5	1.73	3.6	14 9.7	**16** 1 32.1	- 7 2.7	+0.0531	0.5483	0.2575	+47	-38
l Leonis	5.3	1.82	6.4	11 0.2	16 8.8	+ 7 3.7	-0.6994	0.5426	0.2753	+ 8	-79
χ Leonis	4.7	1.82	8.0	7 48.3	23 20.3	- 9 59.6	+0.4811	0.5405	0.2817	+73	-19
308 B. Leonis	5.8	1.87	8.3	8 32.1	**17** 3 26.4	- 6 1.6	-1.4090	0.5394	0.2848	-48	-82
σ Leonis	4.1	+1.87	- 9.2	+ 6 30.2	6 42.8	- 2 51.9	-0.3254	0.5385	-0.2873	+28	-63
80 Leonis	6.4	1.85	9.9	4 20.2	8 52.7	- 0 46.3	+1.2064	0.5382	0.2883	+90	+22
89 Leonis	5.7	1.87	10.5	3 32.4	12 48.8	+ 3 1.9	+0.8576	0.5377	0.2900	+90	0
β Virginis	3.8	1.92	11.6	2 15.1	20 19.0	+10 17.0	-0.0513	0.5369	0.2926	+42	-48
27 B. Virginis	6.5	1.91	12.1	+ 1 0.7	**18** 0 13.4	- 9 56.4	+0.0362	0.5368	0.2930	+46	-43
13 Virginis	5.9	+1.95	-13.1	- 0 18.4	9 17.8	- 1 10.1	-1.3183	0.5370	-0.2929	-32	-90
162 B. Virginis	6.2	1.94	14.0	4 8.3	13 32.6	+ 2 56.2	+1.2465	0.5374	0.2918	+86	+27
200 B. Virginis	6.3	1.94	14.2	4 34.6	15 17.3	+ 4 37.4	+1.1735	0.5376	0.2914	+86	+21
f Virginis	6.0	1.95	14.4	5 21.4	17 39.5	+ 6 54.9	+1.2586	0.5379	0.2908	+85	+28
319 B. Virginis	6.3	1.97	14.8	5 49.8	22 36.6	+11 42.0	+0.2942	0.5388	0.2883	+61	-30
g Virginis	5.6	+2.00	-15.6	- 8 31.4	**19** 8 12.3	- 3 1.6	+0.2363	0.5410	-0.2822	+57	-32
50 Virginis	6.2	1.99	15.7	9 52.2	8 45.1	- 2 29.9	+1.4263	0.5412	0.2816	+81	+54
α Virginis	1.2	2.01	16.0	10 42.7	15 44.9	+ 4 15.7	+0.3178	0.5434	0.2750	+60	-28
550 B. Virginis	6.0	2.03	16.2	12 46.4	20 0.4	+ 8 22.4	+1.2170	0.5449	0.2706	+78	+26
86 Virginis	5.6	2.05	16.3	11 59.7	**20** 1 3.0	-10 45.4	-0.9129	0.5468	0.2641	- 6	-90
621 B. Virginis	6.4	+2.06	-16.4	-14 33.5	9 14.2	- 2 51.4	-0.4632	0.5502	-0.2528	+17	-72
214 G. Virginis	6.5	2.06	16.4	15 55.5	9 34.1	- 2 32.1	+0.8262	0.5503	0.2523	+75	- 1
40 H. Virginis	5.1	2.07	16.4	15 53.8	12 2.0	- 0 9.4	+0.1801	0.5514	0.2484	+49	-35
43 B. Libræ	5.7	2.14	16.3	21 1.7	**21** 8 2.3	- 4 52.2	+0.7477	0.5603	0.2115	+68	- 4
47 G. Libræ	6.1	2.12	15.5	21 41.9	11 52.3	- 1 10.6	+0.6342	0.5620	0.2029	+68	-10
64 G. Libræ	5.8	+2.12	-15.3	-22 4.9	16 2.6	+ 2 50.4	+0.1972	0.5638	-0.1936	+43	-34
153 B. Libræ	6.3	2.15	14.7	24 11.9	22 59.9	+ 9 32.3	+1.0700	0.5665	0.1772	+66	+19
169 B. Libræ	6.0	2.14	14.8	22 51.5	**22** 0 56.5	+11 24.6	-0.6439	0.5672	0.1722	- 2	-90
177 B. Libræ	6.2	2.14	14.7	22 52.2	1 35.1	-11 58.3	-0.7417	0.5675	0.1707	- 8	-90
42 Libræ	5.0	2.14	14.6	23 32.4	1 57.4	-11 36.9	-0.1182	0.5676	0.1698	+24	-51
b Scorpii	4.7	+2.15	-14.0	-25 29.5	6 20.0	- 7 24.2	+1.1673	0.5692	-0.1587	+65	+29
A Scorpii	4.6	2.15	14.0	25 4.3	7 25.2	- 6 21.4	+0.5649	0.5696	0.1559	+59	-13
31 B. Scorpii	5.4	2.14	14.1	24 16.7	7 32.9	- 6 14.0	-0.2713	0.5696	0.1556	+15	-61
32 B. Scorpii	5.3	2.13	14.2	23 43.4	7 34.1	- 6 12.9	-0.8463	0.5696	0.1556	-15	-90
3 Scorpii	5.9	2.14	14.0	24 59.4	7 51.0	- 5 56.6	+0.4143	0.5697	0.1549	+51	-22
40 B. Scorpii	5.4	+2.14	-13.9	-24 35.1	9 27.7	- 4 23.5	-0.2496	0.5701	-0.1504	+16	-60
π Scorpii	3.0	2.15	13.7	25 52.1	9 33.2	- 4 18.2	+1.0588	0.5701	0.1504	+65	+19
48 B. Scorpii	4.9	2.14	13.6	25 37.6	11 23.7	- 2 31.9	+0.5388	0.5706	0.1452	+57	-15
50 B. Scorpii	6.4	2.13	13.8	24 29.5	11 38.5	- 2 17.7	-0.6694	0.5707	0.1445	- 6	-90
24 G. Scorpii	6.2	2.12	13.7	24 14.0	13 15.5	- 0 44.4	-1.1663	0.5711	0.1403	-39	-90
65 B. Scorpii	5.5	+2.14	-13.3	-26 5.9	13 19.9	- 0 40.2	+0.7482	0.5711	-0.1400	+62	- 2
85 B. Scorpii	6.0	2.12	13.3	25 15.6	16 6.1	+ 1 59.6	-0.4953	0.5719	0.1326	+ 1	-77
σ Scorpii	3.1	2.11	13.0	25 23.3	18 39.4	+ 4 27.2	-0.6937	0.5725	0.1257	- 9	-90
α Scorpii	1.2	2.14	12.6	26 14.6	21 58.4	+ 7 38.5	-0.2099	0.5730	0.1162	+15	-57
116 B. Scorpii	6.2	2.14	12.5	26 21.1	22 46.3	+ 8 24.5	-0.1887	0.5731	0.1138	+16	-56
134 B. Scorpii	6.4	+2.12	-11.8	-27 17.8	**23** 3 58.3	-10 35.4	+0.2393	0.5738	-0.0990	+36	-31

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. Δα	Red'ns from 1913.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		s	"	° '	d h m	h m				°	°
95 G. Ophiuchi	6.1	+2.07	-10.5	-27 39.5	23 15 18.2	+ 0 18.2	-0.3200	0.5739	-0.0660	+ 4	-65
43 Ophiuchi	5.4	2.07	10.0	28 3.7	19 42.6	+ 4 32.4	-0.1581	0.5736	0.0529	+11	-54
163 G. Ophiuchi	6.3	2.01	9.1	27 50.7	24 3 46.7	-11 42.1	-0.7193	0.5720	0.0291	-20	-90
X Sagittarii (*var.*)	4.4	1.99	8.9	27 48.1	5 30.6	-10 2.1	-0.8128	0.5717	0.0237	-26	-90
10 G. Sagittarii	5.7	1.97	8.4	28 3.2	9 13.4	- 6 27.8	-0.6143	0.5705	0.0128	-15	-90
210 B. Scorpii	5.8	+1.97	- 8.1	-28 45.1	10 0.6	- 5 42.5	+0.1170	0.5703	-0.0107	+22	-38
W Sagittarii (*var.*)	4.3	1.96	7.6	29 35.2	12 35.8	- 3 13.1	+0.9865	0.5693	-0.0030	+61	+16
38 B. Sagittarii	4.7	1.93	7.7	28 28.2	13 52.3	- 1 59.5	-0.2026	0.5688	+0.0004	+ 5	-57
C. D.-28° 14268	6.4	1.93	7.4	28 55.4	15 27.5	- 0 28.0	+0.2848	0.5682	0.0053	+31	-28
48 G. Sagittarii	6.3	1.90	7.4	28 19.2	17 41.9	+ 1 41.4	-0.3396	0.5674	0.0116	- 1	-66
62 B. Sagittarii	6.0	+1.90	- 7.2	-28 41.0	17 42.1	+ 1 41.6	+0.0494	0.5674	+0.0116	+18	-42
58 G. Sagittarii	6.1	1.91	7.0	28 28.3	19 36.2	+ 3 31.4	-0.1491	0.5666	0.0171	+ 8	-54
τ Sagittarii	3.5	1.70	5.0	27 48.0	25 14 31.2	- 2 15.5	-0.0488	0.5560	0.0688	+18	-48
183 B. Sagittarii	6.2	1.72	4.7	28 46.4	14 44.8	- 2 2.5	+1.0162	0.5559	0.0695	+62	+18
234 B. Sagittarii	5.9	1.66	4.0	28 2.1	22 6.9	+ 5 3.8	+0.8059	0.5510	0.0881	+62	+ 2
248 B. Sagittarii	5.7	+1.62	- 4.0	-27 9.9	26 0 28.9	+ 7 20.9	+0.0801	0.5493	+0.0939	+28	-40
ω Sagittarii	4.8	1.47	2.9	26 31.9	12 4.6	- 5 27.5	+0.6455	0.5409	0.1208	+62	- 8
A Sagittarii	4.9	1.45	2.8	26 26.0	13 30.1	- 4 5.0	+0.7129	0.5398	0.1240	+64	- 4
56 B. Capricorni	6.3	1.23	1.5	24 5.6	27 8 49.1	- 9 24.2	+0.9506	0.5251	0.1632	+66	+10
17 Capricorni	5.8	1.15	2.1	21 49.9	11 45.6	- 6 33.3	-1.0438	0.5229	0.1684	-25	-90
η Capricorni	4.8	+1.06	- 1.8	-20 12.0	20 45.0	+ 2 9.2	-1.2549	0.5163	+0.1837	-41	-90
χ Capricorni	5.3	1.05	1.1	21 32.6	22 48.2	+ 4 8.6	+0.6059	0.5149	0.1869	+66	-12
27 Capricorni	6.1	1.04	1.3	20 54.4	23 18.1	+ 4 37.6	-0.0028	0.5145	0.1876	+34	-45
φ Capricorni	5.3	1.00	1.0	21 0.8	28 2 22.0	+ 7 35.9	+0.6982	0.5124	0.1924	+69	- 7
128 B. Capricorni	6.5	0.90	0.9	19 31.7	9 42.9	- 9 16.4	+0.5143	0.5075	0.2030	+64	-17
γ Capricorni	3.8	+0.81	- 1.3	-17 3.4	14 58.4	- 4 10.2	-1.1295	0.5043	+0.2099	-25	-90
δ Capricorni	3.0	0.77	1.3	16 31.4	18 37.1	- 0 37.9	-0.9456	0.5020	0.2147	-12	-90
152 B. Capricorni	6.5	0.79	0.7	17 15.1	20 17.9	+ 1 0.0	+0.2230	0.5011	0.2166	+49	-33
ι Aquarii	4.4	0.66	1.0	14 17.5	29 4 59.1	+ 9 26.3	-1.1256	0.4965	0.2263	-23	-90
39 Aquarii	6.2	0.63	0.6	14 37.4	8 13.3	-11 24.8	-0.0218	0.4949	0.2297	+39	-46
42 Aquarii	5.5	+0.59	- 0.9	-13 16.0	10 36.6	- 9 5.7	-0.9723	0.4939	+0.2320	-11	-90
45 Aquarii	6.1	0.59	0.7	13 44.5	11 48.5	- 7 55.8	-0.1673	0.4934	0.2331	+33	-54
50 Aquarii	5.9	0.56	0.4	13 58.2	14 47.0	- 5 2.2	+0.7856	0.4921	0.2359	+77	- 3
182 B. Aquarii	6.2	0.52	0.4	13 21.7	17 51.0	- 2 3.3	+0.8387	0.4908	0.2388	+77	0
58 Aquarii	6.4	0.49	0.9	11 21.1	18 47.2	- 1 8.6	-1.1625	0.4905	0.2396	-23	-90
70 Aquarii	6.1	+0.43	- 0.2	-11 0.9	30 4 8.6	+ 7 57.5	+0.7420	0.4874	+0.2467	+79	- 6
81 Aquarii	6.4	0.32	0.8	7 31.7	11 24.6	- 8 58.3	-1.3065	0.4856	0.2515	-34	-90
h Aquarii	5.4	0.31	0.4	8 9.8	13 31.6	- 6 54.7	-0.0695	0.4852	0.2527	+40	-48
φ Aquarii	4.4	0.25	0.6	6 31.1	18 43.6	- 1 51.0	-0.5672	0.4841	0.2557	+15	-79
96 Aquarii	5.7	0.24	0.4	5 36.0	21 36.3	+ 0 57.0	-0.8445	0.4839	0.2570	0	-90
317 B. Aquarii	6.3	+0.24	- 0.2	- 6 23.0	22 20.9	+ 1 40.5	+0.2128	0.4838	+0.2573	+56	-34

MAY.

Name.	Mag.	Δα	Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
337 B. Aquarii	6.4	+0.18	- 0.2	- 5 0.4	1 3 22.6	+ 6 34.3	-0.0089	0.4834	+0.2594	+44	-45
342 B. Aquarii	6.5	+0.17	- 0.3	- 4 33.8	4 30.7	+ 7 40.5	-0.2040	0.4833	+0.2598	+34	-55
20 Piscium	5.6	0.09	0.0	3 14.7	13 52.9	- 7 12.2	+0.7907	0.4834	0.2625	+87	- 4
Mars	1.2	....	....	3 4.1	15 15.8	- 5 50.9	+0.8887	0.4515	0.2495	+87	+ 1
60 B. Piscium	6.0	0.03	- 0.4	0 22.5	17 47.3	- 3 24.0	-1.3452	0.4836	0.2635	-35	-90
80 B. Piscium	6.3	+0.01	+ 0.3	- 0 59.2	23 38.2	+ 2 17.6	+0.8728	0.4844	0.2642	+90	+ 1
98 B. Piscium	6.3	-0.06	+ 0.3	+ 1 12.3	2 6 51.1	+ 9 18.9	+0.3709	0.4855	+0.2647	+65	-26
44 Piscium	6.0	0.09	0.5	1 27.5	11 9.1	-10 30.0	+1.2300	0.4867	0.2642	+90	+24
60 Piscium	6.2	0.19	0.6	6 16.0	23 25.7	+ 1 26.6	-0.8030	0.4906	0.2620	+ 3	-84
62 Piscium	6.1	0.20	0.6	6 49.5	23 55.1	+ 1 55.2	-1.2853	0.4908	0.2619	-31	-84
147 B. Piscium	5.9	0.16	0.5	4 50.0	23 56.5	+ 1 56.6	+0.8983	0.4908	0.2619	+90	+ 2
171 B. Piscium	6.3	-0.23	+ 1.2	+ 6 0.9	3 6 17.0	+ 8 6.7	+1.2624	0.4933	+0.2600	+90	+28

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		s	″	° ′	d h m	h m				°	°
ε Piscium	4.4	−0.25	+ 1.1	+ 7 25.3	8 7 59.2	+ 9 46.1	+0.1685	0.4942	+0.2592	+54	−35
				NEW	*MOON.*						
17 B. Aurigæ	6.0	−0.27	+ 9.2	+27 45.3	7 19 50.3	− 5 54.0	−0.4613	0.5741	+0.0885	+19	−48
38 B. Aurigæ	6.5	0.23	9.4	27 34.7	8 0 36.8	− 1 18.6	+0.1153	0.5767	0.0746	+51	−16
47 B. Aurigæ	6.0	−0.20	+ 9.6	+27 55.5	2 39.3	+ 0 39.1	−0.0999	0.5778	+0.0687	+39	−26
354 B. Tauri	6.4	0.15	9.7	27 52.4	7 7.8	+ 4 57.2	+0.2331	0.5802	0.0558	+59	− 8
22 Aurigæ	6.4	0.15	10.0	28 51.4	8 3.6	+ 5 50.7	−0.7442	0.5805	0.0528	+ 2	−62
β Tauri	1.8	0.13	9.9	28 32.3	9 13.0	+ 6 57.4	−0.3511	0.5810	0.0492	+25	−38
107 B. Aurigæ	6.5	0.08	9.9	27 36.5	13 1.9	+10 37.2	+0.7829	0.5823	0.0378	+90	+22
116 B. Aurigæ	5.9	−0.07	+10.2	+29 10.1	14 19.9	+11 52.2	−0.7947	0.5828	+0.0337	− 2	−61
406 B. Tauri	5.6	−0.01	10.0	27 56.7	18 55.2	− 7 43.5	+0.6009	0.5844	0.0198	+89	+14
136 Tauri	4.6	+0.01	10.0	27 35.7	19 50.8	− 6 50.1	+0.9816	0.5845	0.0168	+90	+36
154 B. Aurigæ	6.4	0.02	10.3	28 55.9	21 5.2	− 5 38.6	−0.3892	0.5847	0.0126	+22	−37
415 B. Tauri	6.1	0.05	10.0	27 34.3	22 50.6	− 3 57.4	+1.0411	0.5850	0.0074	+90	+41
183 B. Aurigæ	6.3	+0.07	+10.5	+29 31.4	9 0 53.8	− 1 59.3	−0.9757	0.5853	+0.0009	−15	−61
κ Aurigæ	4.4	0.12	10.4	29 32.0	4 24.0	+ 1 22.5	−1.0021	0.5858	−0.0100	−17	−61
211 B. Aurigæ	6.3	0.16	10.5	29 35.0	6 39.3	+ 3 32.4	−1.0839	0.5862	0.0171	−25	−61
49 Aurigæ	5.1	0.24	10.1	28 5.6	12 7.0	+ 8 46.9	+0.3173	0.5859	0.0345	+65	− 1
53 Aurigæ	5.6	0.26	10.4	29 3.8	13 20.2	+ 9 57.1	−0.7285	0.5858	0.0383	+ 2	−61
54 Aurigæ	5.8	+0.27	+10.2	+28 20.6	13 48.1	+10 23.9	−0.0037	0.5858	−0.0398	+44	−18
28 Geminorum	5.5	0.30	10.3	29 3.8	15 48.7	−11 40.4	−0.8323	0.5857	0.0462	− 4	−61
47 Geminorum	5.6	0.45	9.4	27 0.2	10 2 13.2	− 1 40.8	+0.6431	0.5836	0.0780	+90	+11
53 Geminorum	5.9	0.48	9.6	28 3.1	3 59.5	+ 0 1.3	−0.5802	0.5831	0.0835	+12	−54
134 B. Geminorum	6.5	0.49	9.3	26 51.0	4 26.4	+ 0 27.0	+0.6193	0.5830	0.0850	+90	+ 9
59 Geminorum	5.7	+0.54	+ 9.4	+27 48.6	7 22.3	+ 3 15.9	−0.6301	0.5822	−0.0937	+ 9	−59
ι Geminorum	3.9	0.55	9.4	27 58.5	7 50.0	+ 3 42.6	−0.8433	0.5820	0.0951	− 5	−63
b^2 Geminorum	5.0	0.57	9.4	28 5.9	9 26.3	+ 5 15.1	−1.1272	0.5813	0.0996	−27	−62
υ Geminorum	4.3	0.61	9.0	27 5.5	11 52.0	+ 7 34.9	−0.3445	0.5803	0.1069	+25	−43
c Geminorum	5.5	0.65	8.4	25 59.6	15 7.8	+10 43.1	+0.4176	0.5789	0.1162	+71	− 4
φ Geminorum	5.0	+0.72	+ 8.5	+26 59.7	18 51.3	− 9 42.2	−1.0612	0.5773	−0.1270	−20	−64
ω Cancri	5.9	0.75	7.9	25 38.0	21 51.2	− 6 49.3	−0.0603	0.5757	0.1350	+41	−30
4 Cancri	6.2	0.75	7.7	25 19.9	22 10.8	− 6 30.5	+0.2045	0.5755	0.1360	+57	−17
ψ Cancri	5.9	0.81	7.5	25 46.5	11 1 41.7	− 3 7.7	−0.7434	0.5736	0.1453	+ 3	−65
λ Cancri	5.9	0.86	6.8	24 17.9	5 48.5	+ 0 49.6	+0.1436	0.5714	0.1562	+53	−21
28 Cancri	6.1	+0.91	+ 6.5	+24 26.2	9 6.8	+ 4 0.3	−0.5274	0.5694	−0.1646	+16	−58
υ^1 Cancri	5.7	0.93	6.4	24 22.6	10 18.5	+ 5 9.3	−0.6651	0.5687	0.1675	+ 8	−66
υ^2 Cancri	6.4	0.94	6.4	24 23.0	10 55.3	+ 5 44.7	−0.7748	0.5683	0.1689	+ 1	−66
γ Cancri	4.7	0.98	5.1	21 47.0	15 12.9	+ 9 52.6	+1.1277	0.5656	0.1793	+90	+32
90 H^1. Cancri	6.1	1.16	+ 3.8	21 38.6	12 4 0.8	− 1 47.8	−1.2117	0.5576	0.2072	−30	−69
107 B. Leonis	6.3	+1.38	− 0.7	+16 10.9	13 2 55.4	− 3 41.7	−0.9051	0.5441	−0.2469	− 4	−74
34 Leonis	6.4	1.38	1.8	13 47.1	5 37.3	− 1 5.4	+0.8476	0.5426	0.2510	+90	+ 3
37 Leonis	5.5	1.42	1.9	14 9.7	7 54.3	+ 1 7.0	−0.1112	0.5414	0.2541	+39	−47
l Leonis	5.3	1.54	4.7	11 0.3	22 54.2	− 8 23.3	−0.8660	0.5350	0.2706	− 1	−79
χ Leonis	4.7	1.58	6.6	7 48.3	14 6 18.0	− 1 14.3	+0.3354	0.5324	0.2770	+63	−26
σ Leonis	4.1	+1.65	− 7.8	+ 6 30.3	13 53.4	+ 6 6.3	−0.4754	0.5306	−0.2816	+20	−72
80 Leonis	6.4	1.65	8.7	4 20.2	16 7.1	+ 8 15.6	+1.0797	0.5301	0.2828	+90	+13
89 Leonis	5.7	1.68	9.3	3 32.5	20 10.3	−11 49.0	+0.7305	0.5294	0.2848	+90	− 7
β Virginis	3.8	1.76	10.5	2 15.1	15 3 53.9	− 4 20.4	−0.1824	0.5287	0.2868	+35	−55
27 B. Virginis	6.5	1.77	11.1	+ 1 0.7	7 55.2	− 0 26.8	−0.0887	0.5286	0.2876	+40	−49
162 B. Virginis	6.2	+1.85	−13.6	− 4 8.3	21 37.7	−11 10.8	+1.1577	0.5296	−0.2863	+86	+20
200 B. Virginis	6.3	1.87	13.8	4 34.6	23 25.3	− 9 26.8	+1.0862	0.5299	0.2857	+86	+15
f Virginis	6.0	1.89	14.2	5 21.4	16 1 51.5	− 7 5.3	+1.1760	0.5304	0.2849	+85	+21
319 B. Virginis	6.3	1.93	14.6	5 49.8	6 56.8	− 2 10.0	+0.2068	0.5313	0.2832	+56	−34
g Virginis	5.6	2.01	15.7	8 31.4	16 47.4	+ 7 21.4	+0.1646	0.5344	0.2768	+53	−36
50 Virginis	6.2	+2.00	−16.0	− 9 52.2	17 20.9	+ 7 53.8	+1.3703	0.5345	−0.2765	+81	+42

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
α Virginis	1.2	+2.07	−16.4	−10 42.7	**17** 0 30.8	− 9 10.5	+0.2606	0.5373	−0.2700	+56	−31
550 B. Virginis	6.0	2.10	16.9	12 46.4	4 52.0	− 4 58.1	+1.1771	0.5391	0.2659	+78	+23
86 Virginis	5.6	2.15	16.9	11 59.7	10 1.0	+ 0 0.5	−0.9661	0.5414	0.2599	− 9	−90
621 B. Virginis	6.4	2.21	17.3	14 33.5	18 21.6	+ 8 4.0	−0.4959	0.5456	0.2491	+15	−75
214 G. Virginis	6.5	2.22	17.5	15 55.5	18 41.8	+ 8 23.6	+0.8063	0.5457	0.2487	+75	− 2
40 H. Virginis	5.1	+2.24	−17.5	−15 53.8	21 12.2	+10 48.8	+0.1588	0.5471	−0.2447	+47	−36
43 B. Libræ	5.7	2.44	18.1	21 1.7	**18** 17 28.6	+ 6 22.2	+0.7672	0.5582	0.2090	+69	− 3
47 G. Libræ	6.1	2.46	17.3	21 41.9	21 20.8	+10 5.9	+0.6595	0.5603	0.2006	+68	− 9
64 G. Libræ	5.8	2.49	17.0	22 5.0	**19** 1 33.0	− 9 51.1	+0.2280	0.5626	0.1912	+44	−32
153 B. Libræ	6.3	2.55	16.6	24 11.9	8 32.8	− 3 6.8	+1.1163	0.5662	0.1753	+66	+23
169 B. Libræ	6.0	+2.55	−16.4	−22 51.5	10 29.9	− 1 14.1	−0.6006	0.5671	−0.1705	− 1	−86
177 B. Libræ	6.2	2.55	16.3	22 52.2	11 8.6	− 0 36.9	−0.6974	0.5674	0.1687	− 5	−90
42 Libræ	5.0	2.56	16.3	23 32.4	11 31.0	− 0 15.3	−0.0712	0.5676	0.1678	+27	−49
b Scorpii	4.7	2.61	15.9	25 29.5	15 54.4	+ 3 58.2	+1.2252	0.5696	0.1571	+65	+36
A Scorpii	4.6	2.61	15.8	25 4.3	16 59.7	+ 5 1.1	+0.6232	0.5701	0.1544	+63	−10
31 B. Scorpii	5.4	+2.60	−15.8	−24 16.7	17 7.4	+ 5 8.5	−0.2149	0.5702	−0.1538	+18	−57
32 B. Scorpii	5.3	2.59	15.7	23 43.4	17 8.7	+ 5 9.7	−0.7912	0.5702	0.1538	−12	−90
3 Scorpii	5.9	2.61	15.7	24 59.4	17 25.6	+ 5 26.0	+0.4728	0.5703	0.1532	+54	−18
40 B. Scorpii	5.4	2.62	15.6	24 35.1	19 2.4	+ 6 59.1	−0.1898	0.5710	0.1493	+19	−56
π Scorpii	3.0	2.64	15.6	25 52.1	19 8.0	+ 7 4.5	+1.1215	0.5710	0.1489	+65	+25
48 B. Scorpii	4.9	+2.65	−15.4	−25 37.7	20 58.6	+ 8 50.9	+0.6033	0.5717	−0.1437	+61	−11
50 B. Scorpii	6.4	2.63	15.4	24 29.5	21 13.3	+ 9 5.1	−0.6066	0.5718	0.1431	− 3	−88
24 G. Scorpii	6.2	2.64	15.2	24 14.0	22 50.4	+10 38.5	−1.1015	0.5724	0.1388	−34	−90
65 B. Scorpii	5.5	2.66	15.1	26 5.9	22 54.8	+10 42.7	+0.8162	0.5724	0.1385	+64	+ 2
85 B. Scorpii	6.0	2.66	14.8	25 15.7	**20** 1 40.9	−10 37.5	−0.4243	0.5733	0.1310	+ 5	−72
σ Scorpii	3.1	+2.67	−14.5	−25 23.3	4 14.0	− 8 10.2	−0.6186	0.5742	−0.1242	− 6	−89
α Scorpii	1.2	2.70	14.1	26 14.6	7 32.6	− 4 59.3	−0.1286	0.5752	0.1149	+18	−52
116 B. Scorpii	6.2	2.70	14.0	26 21.2	8 20.3	− 4 13.4	−0.1059	0.5754	0.1128	+19	−51
134 B. Scorpii	6.4	2.73	13.2	27 17.8	13 31.2	+ 0 45.5	+0.3301	0.5764	0.0980	+41	−26
95 G. Ophiuchi	6.1	2.76	11.6	27 39.5	**21** 0 47.2	+11 35.2	−0.2109	0.5775	0.0649	+ 9	−57
43 Ophiuchi	5.4	+2.77	−10.8	−28 3.7	5 9.5	− 8 12.7	−0.0426	0.5776	−0.0517	+17	−47
163 G. Ophiuchi	6.3	2.75	9.6	27 50.7	13 9.3	− 0 31.3	−0.5899	0.5765	0.0280	−13	−88
X Sagittarii (*var.*)	4.4	2.74	9.3	27 48.1	14 52.2	+ 1 7.4	−0.6806	0.5761	0.0226	−18	−90
10 G. Sagittarii	5.7	2.74	8.7	28 3.2	18 32.7	+ 4 39.4	−0.4776	0.5755	0.0119	− 8	−77
210 B. Scorpii	5.8	2.78	8.4	28 45.1	19 19.4	+ 5 24.3	+0.2523	0.5753	0.0094	+29	−30
W Sagittarii (*var.*)	4.3	+2.79	− 7.8	−29 35.2	21 52.9	+ 7 51.9	+1.1223	0.5743	−0.0019	+61	+29
38 B. Sagittarii	4.7	2.76	7.8	28 28.2	23 8.5	+ 9 4.6	−0.0606	0.5738	+0.0019	+12	−48
C. D.−28° 14268	6.4	2.76	7.5	28 55.4	**22** 0 42.6	+10 35.1	+0.4271	0.5732	0.0065	+40	−20
48 G. Sagittarii	6.3	2.74	7.3	28 19.1	2 55.4	−11 17.1	−0.1916	0.5724	0.0129	+ 6	−56
62 B. Sagittarii	6.0	2.75	7.1	28 41.0	2 55.6	−11 16.9	+0.1957	0.5724	0.0129	+27	−33
58 G. Sagittarii	6.1	+2.73	− 6.8	−28 28.3	4 48.3	− 9 28.5	+0.0009	0.5717	+0.0186	+16	−44
φ Sagittarii	3.3	2.64	5.4	27 5.0	14 33.9	− 0 5.1	−1.1633	0.5668	0.0462	−47	−90
τ Sagittarii	3.5	2.62	3.7	27 48.0	23 28.8	+ 8 30.0	+0.1251	0.5615	0.0704	+28	−37
183 B. Sagittarii	6.2	2.64	3.5	28 46.4	23 42.2	+ 8 42.9	+1.1847	0.5613	0.0710	+62	+35
234 B. Sagittarii	5.9	2.56	2.4	28 2.1	**23** 6 58.3	− 8 16.9	+0.9842	0.5565	0.0902	+62	+15
248 B. Sagittarii	5.7	+2.52	− 2.2	−27 9.9	9 18.4	− 6 1.8	+0.2654	0.5547	+0.0958	+38	−29
ω Sagittarii	4.8	2.43	0.5	26 31.9	20 44.8	+ 5 0.4	+0.8408	0.5457	0.1231	+64	+ 4
A Sagittarii	4.9	2.41	− 0.3	26 25.9	22 9.2	+ 6 21.9	+0.9093	0.5447	0.1259	+64	+ 9
36 B. Capricorni	6.2	2.18	+ 0.7	22 40.8	**24** 12 14.4	− 4 1.3	−1.1763	0.5331	0.1554	−38	−90
56 B. Capricorni	6.3	2.16	2.0	24 5.5	17 14.1	+ 0 48.6	+1.1649	0.5291	0.1649	+66	+28
17 Capricorni	5.8	+2.10	+ 1.7	−21 49.8	20 8.8	+ 3 37.7	−0.8166	0.5266	+0.1703	−11	−90
η Capricorni	4.8	1.97	2.3	20 11.9	**25** 5 2.6	−11 45.4	−1.0202	0.5195	0.1853	−21	−90
χ Capricorni	5.3	1.97	3.0	21 32.6	7 4.7	− 9 47.0	+0.8331	0.5180	0.1886	+69	+ 2
27 Capricorni	6.1	1.95	2.8	20 54.3	7 34.3	− 9 18.4	+0.2275	0.5176	0.1893	+47	−32
φ Capricorni	5.3	1.92	3.2	21 0.9	10 36.6	− 6 21.7	+0.9277	0.5153	0.1937	+69	+ 7
128 B. Capricorni	6.5	+1.80	+ 3.6	−19 31.6	17 53.9	+ 0 42.4	+0.7494	0.5099	+0.2043	+70	− 4

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle. H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
γ Capricorni	3.8	+1.74	+3.5	−17 3.3	**25** 23 7.2	+ 5 46.4	−0.8859	0.5064	+0.2108	− 9	−90
δ Capricorni	3.0	1.69	3.6	16 31.3	**26** 2 44 6	+ 9 17.5	−0.7008	0.5039	0.2154	+ 2	−90
152 B. Capricorni	6.5	1.68	4.1	17 15.0	4 24.8	+10 54.6	+0.4639	0.5028	0.2175	+63	−20
ι Aquarii	4.4	1.53	4.0	14 17.5	13 3.4	− 4 41.7	−0.8784	0.4977	0.2267	− 6	−90
39 Aquarii	6.2	1.50	4.4	14 37.3	16 16.8	− 1 33.7	+0.2229	0.4959	0.2299	+52	−33
42 Aquarii	5.5	+1.45	+4.1	−13 15.9	18 39.7	+ 0 45.2	−0.7251	0.4945	+0.2324	+ 3	−90
45 Aquarii	6.1	1.48	4.6	13 44.4	19 51.4	+ 1 54.9	+0.0779	0.4940	0.2334	+45	−40
50 Aquarii	5.9	1.44	5.0	13 58.2	22 49.5	+ 4 48.0	+1.0289	0.4926	0.2359	+77	+12
182 B. Aquarii	6.2	1.41	5.0	13 21.6	**27** 1 53.0	+ 7 46.5	+1.0817	0.4912	0.2385	+77	+16
σ Aquarii	4.9	1.36	4.3	11 7.3	2 15.1	+ 8 8.0	−1.3032	0.4911	0.2388	−37	−90
58 Aquarii	6.4	+1.36	+4.4	−11 21.0	2 49.2	+ 8 41.2	−0.9154	0.4908	+0.2392	− 6	−90
70 Aquarii	6.1	1.25	5.1	11 0.8	12 10.0	− 6 13.3	+0.9840	0.4872	0.2461	+79	+ 8
81 Aquarii	6.4	1.16	4.6	7 31.6	19 26.0	+ 0 50.9	−1.0641	0.4850	0.2507	−13	−90
h Aquarii	5.4	1.15	5.0	8 9.7	21 33.2	+ 2 54.7	+0.1708	0.4844	0.2518	+53	−36
φ Aquarii	4.4	1.07	4.8	6 31.0	**28** 2 45.6	+ 7 58.8	−0.3295	0.4833	0.2544	+27	−63
96 Aquarii	5.7	+1.03	+4.7	− 5 35.9	5 38.6	+10 47.1	−0.6084	0.4827	+0.2558	+13	−83
317 B. Aquarii	6.3	1.03	5.1	6 22.9	6 23.2	+11 30.5	+0.4479	0.4826	0.2562	+70	−22
337 B. Aquarii	6.4	0.96	4.9	5 0.3	11 25.6	− 7 35.1	+0.2227	0.4822	0.2579	+57	−33
342 B. Aquarii	6.5	0.95	4.8	4 33.7	12 34.0	− 6 28.4	+0.0270	0.4821	0.2583	+46	−43
20 Piscium	5.6	0.87	5.3	3 14.6	21 57.9	+ 2 40.5	+1.0139	0.4818	0.2608	+87	+10
60 B. Piscium	6.0	+0.80	+4.6	− 0 22.4	**29** 1 53.0	+ 6 29.5	−1.1264	0.4820	+0.2614	−16	−90
80 B. Piscium	6.3	0.75	5.2	− 0 59.1	7 45.3	−11 47.5	+1.0853	0.4823	0.2622	+90	+14
98 B. Piscium	6.3	0.66	4.9	+ 1 12.4	14 59.8	− 4 44.5	+0.5742	0.4839	0.2622	+80	−15
44 Piscium	6.0	0.64	5.3	1 27.6	19 18.8	− 0 32.5	+1.4278	0.4847	0.2622	+90	+49
60 Piscium	6.2	0.48	4.6	6 16.1	**30** 7 38.1	+11 26.9	−0.6238	0.4887	0.2599	+12	−82
62 Piscium	6.1	+0.48	+4.5	+ 6 49.6	8 7.5	+11 55.4	−1.1071	0.4891	+0.2596	−16	−84
147 B. Piscium	5.9	0.51	4.6	4 50.1	8 8.9	+11 56.8	+1.0767	0.4891	0.2596	+90	+13
δ Piscium	4.6	0.47	4.4	7 6.8	8 20.6	−11 51.8	−1.3636	0.4892	0.2596	−40	−83
171 B. Piscium	6.3	0.43	5.1	6 0.9	14 30.6	− 5 51.9	+1.4299	0.4920	0.2573	+90	+55
ε Piscium	4.4	0.40	4.8	7 25.4	16 13.1	− 4 12.2	+0.3335	0.4928	0.2567	+63	−27
π Piscium	5.6	+0.25	+5.0	+11 41.9	**31** 10 31.7	−10 24.7	+0.3013	0.5035	+0.2459	+61	−27

JUNE.

20 H^1. Arietis	6.4	+0.12	+4.9	+16 49.1	**1** 3 2.5	+ 5 36.7	−1.2697	0.5158	+0.2308	−33	−74
19 Arietis	5.8	+0.12	+5.5	+14 52.4	4 53.7	+ 7 24.5	+1.2459	0.5174	0.2288	+90	+34
27 Arietis	6.4	0.05	5.6	17 19.3	13 38.3	− 8 7.3	+0.5760	0.5248	0.2180	+82	− 8
μ Arietis	5.7	+0.02	5.6	19 38.6	19 6.5	− 2 49.6	−0.7312	0.5296	0.2108	+ 5	−71
47 Arietis	5.8	−0.01	6.0	20 19.3	**2** 2 28.0	+ 4 17.5	+0.0552	0.5366	+0.1988	+48	−31
				NEW	*MOON.*						
47 Geminorum	5.6	+0.33	+8.7	+27 0.2	**6** 8 40.1	+ 6 33.5	+0.4832	0.5907	−0.0807	+77	+ 3
53 Geminorum	5.9	0.36	8.8	28 3.1	10 24.3	+ 8 13.5	−0.7325	0.5900	0.0862	+ 2	−62
134 B. Geminorum	6.5	0.36	8.5	26 51.0	10 50.7	+ 8 38.8	+0.4558	0.5899	0.0873	+74	0
59 Geminorum	5.7	0.39	8.7	27 48.6	13 43.2	+11 24.3	−0.7878	0.5888	0.0962	− 1	−63
ι Geminorum	3.9	+0.40	+8.7	+27 58.5	14 10.4	+11 50.4	−0.9995	0.5886	−0.0976	−16	−63
υ Geminorum	4.3	0.44	8.3	27 5.5	18 7.8	− 8 21.8	−0.5118	0.5871	0.1098	+16	−52
c Geminorum	5.5	0.47	8.0	25 59.6	21 20.0	− 5 17.3	+0.2385	0.5854	0.1192	+59	−13
φ Geminorum	5.0	0.52	8.0	26 59.6	**7** 0 59.6	− 1 46.4	−1.2339	0.5834	0.1294	−39	−64
ω Cancri	5.9	0.55	7.6	25 38.0	3 56.3	+ 1 3.2	−0.2463	0.5818	0.1380	+31	−40
4 Cancri	6.2	+0.55	+7.5	+25 19.9	4 15.6	+ 1 21.8	+0.0161	0.5817	−0.1387	+45	−27
ψ Cancri	5.9	0.60	7.2	25 46.4	7 42.9	+ 4 41.0	−0.9298	0.5796	0.1484	−10	−65
35 B. Cancri	6.4	0.59	6.7	23 24.1	9 2.3	+ 5 57.2	+1.2788	0.5788	0.1518	+90	+51
λ Cancri	5.9	0.64	6.8	24 17.9	11 45.8	+ 8 34.3	−0.0558	0.5769	0.1589	+41	−32
28 Cancri	6.1	0.68	6.6	24 26.2	15 1.1	+11 42.1	−0.7266	0.5748	0.1672	+ 4	−66
υ^1 Cancri	5.7	+0.69	+6.5	+24 22.6	16 11.6	−11 10.1	−0.8656	0.5740	−0.1703	− 5	−66

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

The Star's					At Conjunction in R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. Δα	Red'ns from 1913.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		s	″	° ′	d h m	h m				°	°
υ^2 Cancri	6.4	+0.70	+ 6.4	+24 23.0	7 16 48.0	−10 35.1	−0.9752	0.5736	−0.1718	−12	−66
γ Cancri	4.7	0.72	5.4	21 47.0	21 2.0	− 6 30.8	+0.9087	0.5706	0.1820	+90	+16
8 Leonis	5.9	0.95	2.0	16 49.7	8 19 47.0	− 8 36.2	+1.2170	0.5539	0.2287	+90	+34
107 B. Leonis	6.3	1.10	+ 0.6	16 10.9	9 8 26.4	+ 3 36.6	−1.1537	0.5453	0.2482	−22	−74
34 Leonis	6.4	1.10	− 0.5	13 47.1	11 7.9	+ 6 12.5	+0.5951	0.5436	0.2516	+83	−10
37 Leonis	5.5	+1.13	− 0.6	+14 9.7	13 24.7	+ 8 24.7	−0.3644	0.5422	−0.2545	+25	−60
l Leonis	5.3	1.27	3.1	11 0.3	10 4 26.0	− 1 4.2	−1.1259	0.5340	0.2702	−18	−79
χ Leonis	4.7	1.31	5.0	7 48.3	11 52.0	+ 6 7.1	+0.0773	0.5309	0.2756	+48	−39
σ Leonis	4.1	1.39	6.1	6 30.3	19 31.0	−10 28.7	−0.7350	0.5282	0.2800	+ 7	−84
80 Leonis	6.4	1.39	7.1	4 20.2	21 46.0	− 8 18.0	+0.8270	0.5275	0.2809	+90	− 1
89 Leonis	5.7	+1.42	− 7 7	+ 3 32.5	11 1 51.6	− 4 20.3	+0.4784	0.5265	−0.2822	+72	−20
β Virginis	3.8	1.53	9.0	2 15.2	9 40.8	+ 3 13.9	−0.4341	0.5250	0.2840	+22	−70
27 B. Virginis	6.5	1.54	9.6	+ 1 0.7	13 45.4	+ 7 10.8	−0 3368	0.5247	0.2842	+27	−64
162 B. Virginis	6.2	1.66	12.4	− 4 8.2	12 3 41.1	− 3 20.0	+0.9333	0.5246	0.2824	+86	+ 5
200 B. Virginis	6.3	1.68	12.7	4 34.6	5 30.6	− 1 34.0	+0.8638	0.5247	0.2820	+86	+ 1
f Virginis	6.0	+1.70	−13.1	− 5 21.4	7 59.5	+ 0 50.2	+0.9582	0.5250	−0.2811	+85	+ 6
319 B. Virginis	6.3	1.76	13.5	5 49.8	13 10.5	+ 5 51 3	−0.0122	0.5260	0.2784	+44	−45
g Virginis	5.6	1.86	14.9	8 31.4	23 13.0	− 8 25.5	−0.0385	0.5284	0.2720	+42	−46
50 Virginis	6.2	1.86	15.3	9 52.2	23 47.2	− 7 52.4	+1.1795	0.5286	0.2716	+81	+22
α Virginis	1.2	1.95	15.9	10 42.7	13 7 6.1	− 0 47.7	+0.0723	0.5308	0.2657	+47	−41
550 B. Virginis	6.0	+2.00	−16.6	−12 46.4	11 33.0	+ 3 30.4	+1.0067	0.5328	−0.2608	+78	+10
86 Virginis	5.6	2.07	16.5	11 59.7	16 48.8	+ 8 35.9	−1.1484	0.5350	0.2550	−23	−90
621 B. Virginis	6.4	2.17	17.2	14 33.5	14 1 20.3	− 7 9.8	−0.6557	0.5392	0.2439	+ 6	−89
214 G. Virginis	6.5	2.17	17.6	15 55.5	1 41.0	− 6 49.7	+0.6608	0.5394	0.2434	+75	−10
40 H. Virginis	5.1	2.21	17.6	15 53.8	4 14.7	− 4 21.2	+0.0120	0.5407	0.2399	+40	−44
43 B. Libræ	5.7	+2 53	−19.0	−21 1.8	15 0 57.1	− 8 21.6	+0.6728	0.5523	−0.2042	+69	− 8
47 G. Libræ	6.1	2.55	18.1	21 41.9	4 53.9	− 4 33.3	+0.5732	0.5546	0.1964	+64	−13
64 G. Libræ	5.8	2.61	17.9	22 5.0	9 11.0	− 0 25.4	+0.1472	0.5570	0.1875	+40	−36
153 B. Libræ	6.3	2.72	17.7	24 12.0	16 18.7	+ 6 26.9	+1.0600	0.5610	0.1713	+66	+19
169 B. Libræ	6.0	2.72	17 3	22 51.5	18 17.9	+ 8 21.7	−0.6674	0.5621	0.1669	− 3	−90
177 B. Libræ	6.2	+2 73	−17 3	−22 52.3	18 57.3	+ 8 59.6	−0.7635	0.5625	−0.1653	− 9	−90
42 Libræ	5.0	2.75	17 3	23 32.4	19 20.1	+ 9 21.6	−0.1309	0.5626	0.1644	+23	−52
b Scorpii	4.7	2.83	17.2	25 29.5	23 48.0	−10 20.4	+1.1869	0.5648	0.1533	+65	+31
A Scorpii	4.6	2.83	17.0	25 4.4	16 0 54.4	− 9 16.5	+0.5825	0.5654	0.1506	+60	−12
31 B. Scorpii	5.4	2.82	16.9	24 16.8	1 2.2	− 9 8.9	−0.2623	0.5654	0.1504	+15	−60
32 B. Scorpii	5.3	+2.81	−16.8	−23 43.4	1 3.6	− 9 7.8	−0.8433	0.5655	−0.1501	−15	−90
3 Scorpii	5.9	2.84	16.9	24 59.5	1 20.7	− 8 51.2	+0.4320	0.5656	0.1495	+52	−21
40 B. Scorpii	5.4	2.85	16.7	24 35.1	2 59.1	− 7 16.4	−0.2325	0.5664	0.1453	+17	−58
π Scorpii	3.0	2.87	16.8	25 52.1	3 4.8	− 7 10.9	+1.0897	0.5664	0.1453	+65	+22
48 B. Scorpii	4.9	2.89	16.6	25 37.7	4 57.1	− 5 22.8	+0.5717	0.5674	0.1405	+59	−13
50 B. Scorpii	6.4	+2.87	−16.4	−24 29.5	5 12.1	− 5 8.3	−0.6473	0.5675	−0.1399	− 5	−90
24 G. Scorpii	6.2	2.88	16.2	24 14.1	6 50.6	− 3 33.6	−1.1421	0.5683	0.1357	−38	−90
65 B. Scorpii	5.5	2.92	16.4	26 5.9	6 55.2	− 3 29.2	+0.7907	0.5683	0.1357	+64	+ 1
85 B. Scorpii	6.0	2.93	16.0	25 15.7	9 43.7	− 0 47.0	−0.4528	0.5694	0.1279	+ 3	−74
σ Scorpii	3.1	2.96	15.6	25 23.4	12 19.0	+ 1 42.5	−0.6427	0.5703	0.1211	− 7	−90
α Scorpii	1.2	+3.01	−15.2	−26 14.6	15 40.4	+ 4 56.3	−0.1412	0.5716	−0.1120	+18	−53
116 B. Scorpii	6.2	3.02	15.2	26 21.2	16 28.8	+ 5 42.8	−0.1165	0.5719	0.1097	+18	−51
134 B. Scorpii	6.4	3.09	14.5	27 17.9	21 43.5	+10 45.6	+0.3349	0.5734	0.0950	+41	−26
95 G. Ophiuchi	6.1	3.19	12.6	27 39.5	17 9 6.8	− 2 17.3	−0.1834	0.5755	0.0622	+11	−56
43 Ophiuchi	5.4	3.23	11.8	28 3.8	13 31.4	+ 1 57.1	−0.0044	0.5757	0.0491	+19	−45
163 G. Ophiuchi	6.3	+3.28	−10.3	−27 50.7	21 34.7	+ 9 41.7	−0.5359	0.5755	−0.0253	−10	−82
X Sagittarii (*var.*)	4.4	3.29	10.0	27 48.1	23 18.3	+11 21.4	−0.6230	0.5752	0.0204	−15	−90
10 G. Sagittarii	5.7	3.31	9.3	28 3.3	18 3 0.0	− 9 5.5	−0.4104	0.5746	0.0094	− 5	−71
210 B. Scorpii	5.8	3.33	9.1	28 45.2	3 46.9	− 8 20.4	+0.3239	0.5745	−0.0072	+33	−26
W Sagittarii (*var.*)	4.3	3.36	8.5	29 35.2	6 21.2	− 5 52.0	+1.2017	0.5741	+0.0006	+61	+39
38 B. Sagittarii	4.7	+3.33	− 8.3	−28 28.2	7 37.1	− 4 38.9	+0.0183	0.5737	+0.0041	+16	−43

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. Δα	Red'ns from 1913.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x′	y′	N.	S.
		s	″	° ′	d h m	h m				°	°
C. D.–28° 14268	6.4	+3.35	– 8.0	–28 55.4	18 9 11.6	– 3 8.1	+0.5106	0.5732	+0.0086	+45	–15
48 G. Sagittarii	6.3	3.33	7.6	28 19.2	11 24.9	– 0 59.8	–0.1049	0.5724	0.0152	+11	–51
62 B. Sagittarii	6.0	3.34	7.5	28 41.0	11 25.1	– 0 59.6	+0.2835	0.5724	0.0152	+32	–28
58 G. Sagittarii	6.1	3.34	7.1	28 28.3	13 18.2	+ 0 49.1	+0.0920	0.5717	0.0208	+22	–39
φ Sagittarii	3.3	3.32	5.1	27 4.9	23 4.9	+10 13.7	–1.0527	0.5677	0.0484	–38	–90
τ Sagittarii	3.5	+3.32	– 3.2	–27 48.0	19 7 59.8	– 5 11.2	+0.2569	0.5630	+0.0728	+35	–30
234 B. Sagittarii	5.9	3.31	1.6	28 2.1	15 28.8	+ 2 1.5	+1.1321	0.5581	0.0923	+62	+28
248 B. Sagittarii	5.7	3.27	– 1.2	27 9.9	17 48.6	+ 4 16.3	+0.4175	0.5566	0.0982	+47	–21
ω Sagittarii	4.8	3.23	+ 1.0	26 31.8	20 5 13.1	– 8 43.4	+1.0158	0.5482	0.1253	+64	+17
A Sagittarii	4.9	3.20	1.3	26 25.9	6 37.2	– 7 22.2	+1.0872	0.5471	0.1287	+64	+23
36 B. Capricorni	6.2	+3.03	+ 3.4	–22 40.8	20 38.8	+ 6 10.9	–0.9689	0.5357	+0.1579	–21	–90
17 Capricorni	5.8	2.94	4.6	21 49.8	21 4 30.8	–10 12.6	–0.5947	0.5294	0.1723	+ 2	–85
η Capricorni	4.8	2.82	5.7	20 11.9	13 22.0	– 1 38.2	–0.7823	0.5222	0.1873	– 6	–90
χ Capricorni	5.3	2.83	6.3	21 32.5	15 23.4	+ 0 19.4	+1.0718	0.5206	0.1906	+69	+18
27 Capricorni	6.1	2.81	6.2	20 54.3	15 52.9	+ 0 48.0	+0.4681	0.5202	0.1914	+60	–19
φ Capricorni	5.3	+2.82	+ 6.9	–21 0.7	18 54.3	+ 3 43.8	+1.1722	0.5178	+0.1962	+69	+26
128 B. Capricorni	6.5	2.71	7.6	19 31.5	22 2 9.5	+10 45.8	+1.0058	0.5123	0.2062	+71	+12
γ Capricorni	3.8	2.61	7.7	17 3.2	7 21.3	– 8 11.7	–0.6197	0.5085	0.2131	+ 6	–86
δ Capricorni	3.0	2.56	7.9	16 31.2	10 57.8	– 4 41.6	–0.4298	0.5061	0.2173	+17	–70
152 B. Capricorni	6.5	2.55	8.4	17 14.9	12 37.6	– 3 4.7	+0.7360	0.5050	0.2192	+73	– 5
ι Aquarii	4.4	+2.44	+ 8.8	–14 17.4	21 14.4	+ 5 17.2	–0.5940	0.4994	+0.2285	+10	–83
39 Aquarii	6.2	2.41	9.3	14 37.2	23 0 27.2	+ 8 24.5	+0.5106	0.4976	0.2316	+69	–18
42 Aquarii	5.5	2.36	9.2	13 15.8	2 49.6	+10 42.9	–0.4341	0.4962	0.2337	+19	–70
45 Aquarii	6.1	2.36	9.5	13 44.3	4 1.1	+11 52.4	+0.3695	0.4956	0.2348	+61	–25
50 Aquarii	5.9	2.33	9.9	13 58.1	6 58.8	– 9 14.9	+1.3231	0.4938	0.2376	+77	+38
182 B. Aquarii	6.2	+2.29	+10.0	–13 21.5	10 2.0	– 6 16.8	+1.3791	0.4924	+0.2398	+77	+46
σ Aquarii	4.9	2.24	9.4	11 7.2	10 24.0	– 5 55.4	–1.0048	0.4923	0.2401	–11	–90
58 Aquarii	6.4	2.24	9.5	11 20.9	10 58.1	– 5 22.2	–0.6163	0.4920	0.2405	+10	–84
70 Aquarii	6.1	2.17	10.5	11 0.7	20 18.4	+ 3 42.7	+1.2906	0.4878	0.2471	+79	+32
λ Aquarii	3.8	2.10	9.8	8 2.4	22 37.6	+ 5 58.2	–1.4213	0.4870	0.2483	–54	–90
81 Aquarii	6.4	+2.04	+10.1	– 7 31.5	24 3 34.5	+10 47.2	–0.7537	0.4852	+0.2511	+ 4	–90
82 Aquarii	6.4	2.03	10.0	7 2.3	4 13.6	+11 25.2	–1.1290	0.4850	0.2514	–18	–90
h Aquarii	5.4	2.03	10.5	8 9.6	5 41.7	–11 9.1	+0.4825	0.4845	0.2522	+71	–20
φ Aquarii	4.4	1.95	10.3	6 30.9	10 54.6	– 6 4.4	–0.0157	0.4832	0.2545	+43	–45
96 Aquarii	5.7	1.91	10.3	5 35.8	13 47.9	– 3 15.7	–0.2940	0.4825	0.2556	+29	–61
317 B. Aquarii	6.3	+1.90	+10.6	– 6 22.8	14 32.7	– 2 32.1	+0.7633	0.4824	+0.2558	+84	– 5
337 B. Aquarii	6.4	1.86	10.7	5 0.2	19 36.0	+ 2 23 1	+0 5393	0.4813	0.2576	+77	–17
342 B. Aquarii	6.5	1.86	10 6	4 33.6	20 44.6	+ 3 29 9	+0.3432	0.4812	0 2579	+64	–27
20 Piscium	5.6	1.75	11.0	3 14.5	25 6 10.7	–11 18.9	+1.3320	0.4805	0 2600	+87	+35
60 B. Piscium	6.0	1.67	10 2	0 22.3	10 7.1	– 7 28.7	–0.8140	0.4806	0 2604	+ 3	–90
80 B. Piscium	6.3	+1.61	+10.8	– 0 59.0	16 1.4	– 1 43.7	+1.4009	0.4809	+0.2608	+90	+45
98 B. Piscium	6.3	1.55	10.7	+ 1 12 5	23 18.8	+ 5 22.1	+0.8853	0.4818	0.2606	+90	0
60 Piscium	6.2	1.33	9.9	6 16.1	26 16 4.9	– 2 18.5	–0.3304	0.4862	0.2573	+28	–63
62 Piscium	6.1	1.32	9.7	6 49.7	16 34.6	– 1 49.6	–0.8160	0.4864	0.2572	+ 2	–84
147 B. Piscium	5.9	1.36	9.9	4 50.2	16 36.0	– 1 48.2	+1.3756	0.4864	0.2572	+90	+41
δ Piscium	4.6	+1.32	+ 9.6	+ 7 6.9	16 47.9	– 1 36.6	–1.0738	0.4864	+0.2571	–14	–83
ε Piscium	4.4	1.27	10.1	7 25 5	27 0 44.7	+ 6 7 2	+0.6202	0.4898	0.2540	+84	–12
π Piscium	5.6	1.09	9.7	11 42.0	19 13.8	+ 0 5.3	+0.5608	0.4999	0.2434	+79	–13
20 H^1. Arietis	6.4	0.92	8.6	16 49.1	28 11 54.0	– 7 43 9	–1.0454	0.5125	0.2276	–14	–74
27 Arietis	6.4	0.85	9.0	17 19.3	22 35.2	+ 2 37.5	+0.7849	0.5216	0.2148	+90	+ 3
μ Arietis	5.7	+0.79	+ 8.6	+19 38.6	29 4 5.8	+ 7 57.7	–0.5379	0.5267	+0.2073	+16	–65
47 Arietis	5.8	0.73	8.6	20 19.4	11 30.3	– 8 52.2	+0.2342	0.5339	0.1957	+58	–23
ε Arietis (*mean*)	4.6	0.72	8.5	20 59.7	12 2.0	– 8 21.5	–0.3791	0.5344	0.1949	+24	–54
ζ Arietis	5.0	0.69	8.8	20 43.5	19 14.6	– 1 23.4	+1.2709	0.5415	0.1828	+90	+45
66 Arietis	6.1	0.64	8.5	22 30.4	30 1 17.4	+ 4 26.8	+0.4513	0.5476	0.1707	+73	– 9
7 Tauri	5.9	+0.62	+ 8.2	+24 10.5	3 55.0	+ 6 58.9	–0.8682	0.5502	+0.1657	– 5	–66

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. Δα	Red'ns from 1913.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		s	″	° ′	d h m	h m				°	°
16 Tauri	5.4	+0.59	+ 8.4	+24 1.1	30 8 25.9	+11 20.3	+0.0263	0.5547	+0.1562	+46	−29
17 Tauri	3.8	0.59	8.5	23 50.6	8 27.9	+11 22.2	+0.2167	0.5547	0.1562	+57	−19
18 Tauri	5.6	0.59	8.3	24 34.2	8 34.7	+11 28.7	−0.5305	0.5549	0.1559	+15	−58
q Tauri	4.3	0.59	8.4	24 11.9	8 36.2	+11 30.2	−0.1351	0.5550	0.1557	+37	−36
20 Tauri	4.1	0.59	8.4	24 5.9	8 52.4	+11 45.8	+0.0108	0.5552	0.1551	+45	−29
21 Tauri	5.8	+0.59	+ 8.4	+24 17.2	8 54.3	+11 47.7	−0.1813	0.5552	+0.1551	+34	−39
22 Tauri	6.5	0.59	8.4	24 15.6	8 58.0	+11 51.2	−0.1438	0.5553	0.1548	+36	−36
23 Tauri	4.3	0.59	8.5	23 40.8	9 5.7	+11 58.6	+0.4856	0.5555	0.1546	+76	− 5
η Tauri	3.0	0.58	8.5	23 50.4	9 35.5	−11 32.6	+0.3952	0.5559	0.1535	+69	−10
104 B. Tauri	5.5	0.58	8.6	23 9.4	9 58.4	−11 10.6	+1.1711	0.5563	0.1526	+90	+38
27 Tauri	3.7	+0.58	+ 8.5	+23 47.4	10 18.8	−10 50.9	+0.5565	0.5567	+0.1518	+82	+ 1
28 Tauri	5.2	0.58	8.5	23 52.4	10 19.4	−10 50.3	+0.4703	0.5567	0.1518	+75	− 5
14 H. Tauri	5.3	0.57	8.1	25 19.2	10 47 1	−10 23.6	−0.9802	0.5571	0.1507	−13	−65
p Tauri	5.6	0.53	8.2	26 15.4	19 26.4	− 2 3.3	−0.7370	0.5656	0.1308	+ 3	−64
φ Tauri	5.0	+0.52	+ 8.1	+27 8.7	23 21.9	+ 1 43.3	−1.1691	0.5694	+0.1209	−31	−63

JULY.

Name.	Mag.	Δα	Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
χ Tauri	5.3	+0.52	+ 8.5	+25 25.6	1 0 18.3	+ 2 37 7	+0.7363	0.5702	+0.1184	+90	+14
				NEW	*MOON.*						
8 Leonis	5.9	+0.83	+ 2.2	+16 49.7	6 2 49.4	+ 0 13.9	+1.0037	0.5615	−0.2337	+90	+18
107 B. Leonis	6.3	0.93	1.1	16 10.9	15 10.6	−11 51.6	−1.3626	0.5525	0.2531	−46	−74
34 Leonis	6.4	0.93	0.2	13 47.1	17 48.3	− 9 19.5	+0.3613	0.5506	0.2566	+65	−21
37 Leonis	5.5	+0.96	+ 0.1	+14 9.8	20 1.9	− 7 10.5	−0.5909	0.5491	−0.2595	+14	−72
l Leonis	5.3	1.06	− 2.1	11 0.3	7 10 43.6	+ 7 0.9	−1.3679	0.5399	0.2746	−42	−79
χ Leonis	4.7	1.09	3.7	7 48.3	18 1.0	− 9 56.3	−0.1860	0.5361	0.2797	+35	−53
σ Leonis	4.1	1.16	4.8	6 30.3	8 1 31.8	− 2 40.4	−0.9992	0.5328	0.2834	− 9	−83
80 Leonis	6.4	1.16	5.6	4 20.3	3 44.5	− 0 32.1	+0.5481	0.5320	0.2843	+78	−16
83 Leonis	6.3	+1.13	− 5.8	+ 3 29.2	4 12.4	− 0 5.1	+1.2713	0.5318	−0.2844	+90	+30
τ Leonis	5.2	1.16	6.0	3 20.0	4 43.8	+ 0 25.3	+1.2752	0.5316	0.2846	+90	+30
89 Leonis	5.7	1.19	6.3	3 32.5	7 46.3	+ 3 21.9	+0.1995	0.5306	0.2855	+56	−34
β Virginis	3.8	1.29	7.4	2 15.2	15 28.9	+10 49.4	−0.7112	0.5283	0.2866	+ 8	−88
27 B. Virginis	6.5	1.30	8.0	+ 1 0.7	19 30.6	− 9 16.6	−0.6163	0.5275	0.2866	+13	−83
31 B. Virginis	6.4	+1.29	− 9.0	− 1 17.1	20 27.0	− 8 22.0	+1.4294	0.5273	−0.2865	+89	+51
162 B. Virginis	6.2	1.41	10.8	4 8.2	9 9 18.3	+ 4 4.5	+0.6466	0.5261	0.2835	+84	−11
200 B. Virginis	6.3	1.43	11.1	4 34.5	11 7.0	+ 5 49.7	+0.5779	0.5261	0.2828	+79	−15
f Virginis	6.0	1.45	11.6	5 21.3	13 34.9	+ 8 12.9	+0.6728	0.5262	0.2816	+84	−10
319 B. Virginis	6.3	1.51	12.1	5 49.7	18 44.4	−10 47.5	−0.2925	0.5264	0.2788	+28	−60
g Virginis	5.6	+1.62	−13.6	− 8 31.3	10 4 45.2	− 1 5.9	−0.3135	0.5278	−0.2716	+26	−62
50 Virginis	6.2	1.62	14.0	9 52.2	5 19.4	− 0 32.8	+0.9039	0.5280	0.2711	+80	+ 3
α Virginis	1.2	1.72	14.6	10 42.7	12 38.5	+ 6 32.1	−0.1961	0.5298	0.2643	+32	−56
i Virginis	5.7	1.72	15.2	12 15.6	13 21.5	+ 7 13.7	+1.1962	0.5300	0.2635	+78	+24
550 B. Virginis	6.0	1.77	15.5	12 46.4	17 5.9	+10 50.7	+0.7437	0.5311	0.2595	+77	− 6
86 Virginis	5.6	+1.85	−15.4	−11 59.7	22 22 9	− 8 2.6	−1.4084	0.5329	−0.2533	−61	−90
621 B. Virginis	6.4	1.97	16.4	14 33.5	11 6 57 2	+ 0 14.5	−0.9045	0.5363	0.2418	− 9	−90
214 G. Virginis	6.5	1.97	16.9	15 55.5	7 18.0	+ 0 34.7	+0.4162	0.5364	0.2414	+61	−23
40 H. Virginis	5.1	2.01	16.9	15 53.8	9 52.8	+ 3 4.3	−0.2308	0.5376	0.2376	+26	−57
43 H. Virginis	5.5	2.04	17.5	17 48.0	11 57.3	+ 5 4.7	+1.2406	0.5386	0.2344	+72	+31
17 G. Libræ	6.4	+2 27	−18.3	−20 48.8	12 1 49.8	− 5 31.3	+1.2640	0.5454	−0.2109	+69	+36
18 G. Libræ	6.1	2.28	18.3	20 57.9	2 17.5	− 5 4.5	+1.3252	0.5456	0.2100	+69	+45
43 B. Libræ	5.7	2.39	19.1	21 1.8	6 47.4	− 0 44.0	+0.4677	0.5479	0.2014	+58	−19
47 G. Libræ	6.1	2.42	18.2	21 41.9	10 47.1	+ 3 7.3	+0.3748	0.5499	0.1934	+52	−24
64 G. Libræ	5.8	2.49	18.0	22 5.0	15 7.6	+ 7 18.6	−0.0454	0.5523	0.1843	+29	−47
153 B. Libræ	6.3	+2.64	−18.1	−24 12.0	22 21.1	− 9 43.3	+0.8874	0.5560	−0.1683	+66	+ 6

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. Δα	Red'ns from 1913.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		s	″	° ′	d h m	h m				°	°
169 B. Libræ	6.0	+2.65	−17.6	−22 51.5	**13** 0 22.0	− 7 46.7	−0.8474	0.5568	−0.1637	−15	−90
177 B. Libræ	6.2	2.66	17.6	22 52.3	1 2.0	− 7 8.2	−0.9428	0.5573	0.1621	−21	−90
42 Libræ	5.0	2.68	17.7	23 32.5	1 25.1	− 6 46.0	−0.3054	0.5575	0.1612	+14	−63
b Scorpii	4.7	2.77	17.8	25 29.6	5 56.9	− 2 24.0	+1.0306	0.5596	0.1503	+65	+17
A Scorpii	4.6	2.79	17.6	25 4.4	7 4.3	− 1 19.0	+0.4241	0.5602	0.1476	+50	−21
31 B. Scorpii	5.4	+2.78	−17.4	−24 16.8	7 12.3	− 1 11.3	−0.4262	0.5603	−0.1472	+ 6	−71
32 B. Scorpii	5.3	2.77	17.2	23 43.4	7 13.6	− 1 10.1	−1.0111	0.5603	0.1472	−27	−90
3 Scorpii	5.9	2.79	17.5	24 59.5	7 31.0	− 0 53.4	+0.2735	0.5604	0.1465	+42	−29
4 Scorpii	5.7	2.81	17.8	26 0.9	7 51.6	− 0 33.5	+1.2958	0.5607	0.1456	+64	+50
40 B. Scorpii	5.4	2.81	17.2	24 35.1	9 10.9	+ 0 42.9	−0.3918	0.5611	0.1424	+ 7	−69
π Scorpii	3.0	+2.83	−17.6	−25 52.2	9 16.6	+ 0 48.4	+0.9397	0.5611	−0.1421	+64	+10
48 B. Scorpii	4.9	2.86	17.3	25 37.7	11 10.7	+ 2 38.3	+0.4218	0.5620	0.1374	+49	−21
50 B. Scorpii	6.4	2.85	17.0	24 29.5	11 25.9	+ 2 53.0	−0.8051	0.5621	0.1368	−16	−90
24 G. Scorpii	6.2	2.87	16.8	24 14.1	13 5.9	+ 4 29.3	−1.3000	0.5628	0.1324	−59	−90
65 B. Scorpii	5.5	2.90	17.2	26 5.9	13 10.5	+ 4 33.7	+0.6465	0.5628	0.1323	+61	− 8
85 B. Scorpii	6.0	+2.93	−16.6	−25 15.7	16 1.7	+ 7 18.5	−0.5999	0.5640	−0.1249	− 5	−87
σ Scorpii	3.1	2.97	16.4	25 23.4	18 39.4	+ 9 50.5	−0.7853	0.5651	0.1180	−16	−90
α Scorpii	1.2	3.04	16.2	26 14.7	22 3.9	−10 52.7	−0.2732	0.5662	0.1090	+10	−61
116 B. Scorpii	6.2	3.06	16.1	26 21.2	22 53.0	−10 5.4	−0.2467	0.5666	0.1068	+11	−59
134 B. Scorpii	6.4	3.16	15.6	27 17.9	**14** 4 12.7	− 4 57.7	+0.2190	0.5682	0.0923	+34	−32
95 G. Ophiuchi	6.1	+3.32	−13.6	−27 39.5	15 46.5	+ 6 9.9	−0.2782	0.5705	−0.0596	+ 5	−62
43 Ophiuchi	5.4	3.39	12.9	28 3.8	20 15.1	+10 28.3	−0.0881	0.5710	0.0468	+13	−50
163 G. Ophiuchi	6.3	3.48	11.3	27 50.8	**15** 4 25.5	− 5 39.9	−0.6052	0.5710	0.0231	−15	−89
X Sagittarii (*var.*)	4.4	3.50	10.9	27 48.1	6 10.5	− 3 58.8	−0.6892	0.5709	0.0180	−20	−90
10 G. Sagittarii	5.7	3.55	10.2	28 3.3	9 55.3	− 0 22.6	−0.4670	0.5705	0.0071	− 9	−76
210 B. Scorpii	5.8	+3.58	−10.1	−28 45.2	10 42.9	+ 0 23.3	+0.2736	0.5704	−0.0048	+29	−29
W Sagittarii (*var.*)	4.3	3.63	9.7	29 35.2	13 19.2	+ 2 53.7	+1.1629	0.5699	+0.0027	+60	+33
38 B. Sagittarii	4.7	3.60	9.2	28 28.2	14 36.1	+ 4 7.7	−0.0253	0.5697	0.0064	+13	−46
C. D. −28° 14268	6.4	3.63	9.0	28 55.4	16 11.9	+ 5 39.9	+0.4736	0.5693	0.0110	+42	−17
48 G. Sagittarii	6.3	3.64	8.5	28 19.2	18 26.8	+ 7 49.7	−0.1406	0.5688	0.0174	+ 8	−53
62 B. Sagittarii	6.0	+3.65	− 8.4	−28 41.1	18 27.0	+ 7 49.8	+0.2500	0.5688	+0.0174	+29	−30
58 G. Sagittarii	6.1	3.65	8.0	28 28.4	20 21.6	+ 9 40.1	+0.0618	0.5682	0.0229	+19	−41
φ Sagittarii	3.3	3.68	5.6	27 5.0	**16** 6 15.2	− 4 48.4	−1.0671	0.5646	0.0506	−41	−90
τ Sagittarii	3.5	3.74	3.7	27 48.0	15 15.7	+ 3 52.3	+0.2696	0.5604	0.0749	+35	−29
234 B. Sagittarii	5.9	3.78	1.8	28 2.1	22 48.8	+11 9.1	+1.1655	0.5560	0.0944	+62	+32
248 B. Sagittarii	5.7	+3.76	− 1.3	−27 9.9	**17** 1 9.8	−10 34.9	+0.4531	0.5546	+0.1002	+48	−19
ω Sagittarii	4.8	3.76	+ 1.4	26 31.8	12 39.2	+ 0 30.4	+1.0794	0.5468	0.1275	+63	+22
A Sagittarii	4.9	3.74	1.7	26 25.9	14 3.8	+ 1 52.1	+1.1539	0.5459	0.1306	+64	+29
36 B. Capricorni	6.2	3.61	4.6	22 40.8	**18** 4 9.7	− 8 30.5	−0.8766	0.5354	0.1602	−17	−90
17 Capricorni	5.8	3.56	6.2	21 49.7	12 3.4	− 0 52.2	−0.4835	0.5293	0.1749	+ 7	−75
η Capricorni	4.8	+3.48	+ 7.8	−20 11.9	20 56.0	+ 7 43.5	−0.6515	0.5225	+0.1899	0	−90
χ Capricorni	5.3	3.51	8.3	21 32.5	22 57.6	+ 9 41.4	+1.2107	0.5210	0.1931	+68	+30
27 Capricorni	6.1	3.50	8.3	20 54.2	23 27.2	+10 10.1	+0.6069	0.5206	0.1938	+66	−12
φ Capricorni	5.3	3.48	8.9	21 0.7	**19** 2 28.9	−10 53.9	+1.3188	0.5183	0.1985	+69	+44
128 B. Capricorni	6.5	3.41	10.1	19 31.5	9 44.6	− 3 51.5	+1.1673	0.5130	0.2086	+70	+25
γ Capricorni	3.8	+3.32	+10.6	−17 3.2	14 56.7	+ 1 11.4	−0.4496	0.5093	+0.2154	+14	−72
δ Capricorni	3.0	3.29	11.0	16 31.2	18 33.2	+ 4 41.4	−0.2519	0.5069	0.2198	+25	−59
152 B. Capricorni	6.5	3.29	11.5	17 14.9	20 13.1	+ 6 18.4	+0.9187	0.5058	0.2217	+73	+ 6
ι Aquarii	4.4	3.17	12.3	14 17.3	**20** 4 49.9	− 9 19.6	−0.3959	0.5002	0.2308	+19	−68
39 Aquarii	6.2	3.15	12.9	14 37.1	8 2.7	− 6 12.3	+0.7158	0.4984	0.2339	+75	− 7
42 Aquarii	5.5	+3.10	+13.0	−13 15.7	10 25.2	− 3 53.8	−0.2255	0.4971	+0.2360	+28	−57
45 Aquarii	6.1	3.11	13.2	13 44.2	11 36.6	− 2 44.4	+0.5815	0.4964	0.2371	+72	−14
σ Aquarii	4.9	3.01	13.6	11 7.2	17 59.6	+ 3 28.0	−0.7834	0.4931	0.2422	+ 1	−90
58 Aquarii	6.4	3.02	13.7	11 20.9	18 33.6	+ 4 1.0	−0.3933	0.4927	0.2427	+21	−67
λ Aquarii	3.8	2.87	14.4	8 2.3	**21** 6 13.3	− 8 38.4	−1.1810	0.4875	0.2503	−24	−90
78 Aquarii	6.3	+2.86	+14.4	− 7 39.8	7 19.4	− 7 34.1	−1.3211	0.4871	+0.2509	−37	−90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

The Star's					At Conjunction in R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.		Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$									
		s	″	° ′	d	h m	h m				°	°
81 Aquarii	6.4	+2.83	+14.8	− 7 31.5	21	11 10.4	− 3 49.3	−0.5054	0.4857	+0.2529	+17	−73
82 Aquarii	6.4	2.82	14.8	7 2.2		11 49.5	− 3 11.3	−0.8803	0.4855	0.2532	− 3	−90
h Aquarii	5.4	2.83	15.2	8 9.6		13 17.8	− 1 45.3	+0.7363	0.4851	0.2539	+82	− 6
φ Aquarii	4.4	2.76	15.2	6 30.8		18 31.0	+ 3 19.5	+0.2441	0.4835	0.2561	+56	−32
96 Aquarii	5.7	2.73	15.4	5 35.7		21 24.7	+ 6 8.7	−0.0314	0.4827	0.2571	+42	−46
316 B Aquarii	6.5	+2.72	+15.1	− 4 23.3		21 54.3	+ 6 37.5	−1.2421	0.4826	+0.2572	−27	−90
317 B. Aquarii	6.3	2.73	15.6	6 22.7		22 9.5	+ 6 52.3	+1.0295	0.4825	0.2573	+84	+11
337 B. Aquarii	6.4	2.68	15.7	5 0.1	22	3 13.5	+11 48.3	+0.8109	0.4814	0.2588	+85	− 2
342 B. Aquarii	6.5	2.67	15.7	4 33.5		4 22.2	−11 4.8	+0.6155	0.4812	0.2591	+82	−13
60 B. Piscium	6.0	2.51	15.8	− 0 22.2		17 47.5	+ 1 59.4	−0.5330	0.4798	0.2611	+17	−76
98 B. Piscium	6.3	+2.39	+16.2	+ 1 12.6	23	7 3.4	− 9 5.5	+1.1803	0.4803	+0.2606	+90	+21
60 Piscium	6.2	2.22	15.6	6 16.2		23 57.6	+ 7 21.9	−0.0369	0.4838	0.2565	+42	−45
62 Piscium	6.1	2.21	15.4	6 49.8	24	0 27.5	+ 7 51.1	−0.5251	0.4840	0.2564	+18	−74
δ Piscium	4.6	2.21	15.3	7 7.0		0 40.8	+ 8 4.0	−0.7843	0.4840	0.2563	+ 4	−83
ε Piscium	4.4	2.14	15.6	7 25.6		8 42.5	− 8 7.3	+0.9181	0.4868	0.2529	+90	+ 5
π Piscium	5.6	+1.97	+14.9	+11 42.1	25	3 25.3	+10 4.6	+0.8511	0.4961	+0.2411	+90	+ 4
20 H^1. Arietis	6.4	1.83	13.4	16 49.2		20 20.3	+ 2 30.2	−0.7815	0.5075	0.2252	+ 3	−73
26 Arietis	6.2	1.74	12.7	19 28.4	26	7 2.5	−11 7.0	−1.3081	0.5161	0.2124	−40	−71
27 Arietis	6.4	1.74	13.4	17 19.4		7 12.1	−10 57.7	+1.0508	0.5162	0.2122	+90	+21
μ Arietis	5.7	1.69	12.6	19 38.7		12 48.4	− 5 31.9	−0.2893	0.5211	0.2045	+29	−50
47 Arietis	5.8	+1.64	+12.5	+20 19.4		20 20.6	+ 1 45.9	+0.4784	0.5280	+0.1931	+75	− 9
ε Arietis (*mean*)	4.6	1.63	12.2	20 59.8		20 52.8	+ 2 17.0	−0.1404	0.5285	0.1922	+37	−40
66 Arietis	6.1	1.52	11.6	22 30.5	27	10 22.2	− 8 40.4	+0.6757	0.5416	0.1682	+90	+ 4
7 Tauri	5.9	1.51	11.1	24 10.6		13 2.4	− 6 5.7	−0.6583	0.5442	0.1628	+ 8	−64
11 Tauri	6.1	1.49	10.8	25 3.1		15 50.4	− 3 23.5	−1.1392	0.5470	0.1571	−26	−65
16 Tauri	5.4	+1.47	+11.0	+24 1.2		17 38.0	− 1 39.7	+0.2352	0.5488	+0.1533	+58	−17
17 Tauri	3.8	1.47	11.1	23 50.6		17 40.1	− 1 37.6	+0.4271	0.5488	0.1533	+71	− 7
18 Tauri	5.6	1.47	10.9	24 34.2		17 47.0	− 1 31.0	−0.3258	0.5489	0.1531	+26	−45
q Tauri	4.3	1.47	11.0	24 11.9		17 48.5	− 1 29.6	+0.0724	0.5490	0.1530	+48	−25
20 Tauri	4.1	1.47	11.0	24 6.0		18 4.9	− 1 13.7	+0.2187	0.5492	0.1524	+57	−17
21 Tauri	5.8	+1.47	+11.0	+24 17.2		18 6.9	− 1 11.7	+0.0254	0.5492	+0.1523	+46	−27
22 Tauri	6.5	1.47	11.0	24 15.6		18 10.6	− 1 8.2	+0.0629	0.5493	0.1522	+48	−25
23 Tauri	4.3	1.47	11.1	23 40.9		18 18.4	− 1 0.7	+0.6968	0.5494	0.1519	+90	+ 7
η Tauri	3.0	1.46	11.1	23 50.4		18 48.7	− 0 31.4	+0.6046	0.5499	0.1508	+87	+ 3
27 Tauri	3.7	1.46	11.1	23 47.5		19 32.8	+ 0 11.1	+0.7661	0.5507	0.1492	+90	+12
28 Tauri	5.2	+1.46	+11.1	+23 52.5		19 33.4	+ 0 11.7	+0.6790	0.5507	+0.1492	+90	+ 7
14 H. Tauri	5.3	1.46	10.6	25 19.2		20 1.6	+ 0 38.9	−0.7827	0.5512	0.1482	0	−65
p Tauri	5.6	1.39	10.2	26 15.4	28	4 49.3	+ 9 7.5	−0.5531	0.5598	0.1279	+14	−56
φ Tauri	5.0	1.37	9.8	27 8.8		8 48.5	−11 2.1	−0.9952	0.5636	0.1181	−15	−63
χ Tauri	5.3	1.35	10.3	25 25.7		9 45.8	−10 6.9	+0.9210	0.5645	0.1157	+90	+25
17 B. Aurigæ	6.0	+1.28	+ 9.3	+27 45.3		22 3.2	+ 1 42.4	−0.2936	0.5754	+0.0826	+28	−37
38 B. Aurigæ	6.5	1.24	9.1	27 34.7	29	2 46.6	+ 6 14.9	+0.2495	0.5792	0.0690	+60	− 7
47 B. Aurigæ	6.0	1.23	9.0	27 55.4		4 47.4	+ 8 10.9	+0.0230	0.5809	0.0631	+46	−18
354 B. Tauri	6.4	1.20	8.8	27 52.3		9 11.8	−11 35.2	+0.3249	0.5839	0.0498	+65	− 2
22 Aurigæ	6.4	1.21	8.5	28 51.4		10 6.7	−10 42.5	−0.6485	0.5847	0.0470	+ 7	−56
β Tauri	1.8	+1.20	+ 8.5	+28 32.2		11 14.8	− 9 37.2	−0.2663	0.5853	+0.0435	+29	−32
107 B. Aurigæ	6.5	1.17	8.6	27 36.5		14 59.3	− 6 1.7	+0.8318	0.5877	0.0318	+90	+27
116 B. Aurigæ	5.9	1.17	8.2	29 10.1		16 15.7	− 4 48.4	−0.7361	0.5885	0.0279	+ 2	−61
406 B. Tauri	5.6	1.14	8.3	27 56.7		20 44.7	− 0 30.4	+0.6139	0.5909	0.0135	+90	+16
136 Tauri	4.6	1.13	8.3	27 35.7		21 39.0	+ 0 21.7	+0.9837	0.5914	0.0106	+90	+38
154 B. Aurigæ	6.4	+1.13	+ 8.0	+28 55.9		22 51.6	+ 1 31.3	−0.3766	0.5919	+0.0067	+23	−35
415 B. Tauri	6.1	1.12	8.2	27 34.3	30	0 34.2	+ 3 9.6	+1.0233	0.5926	+0.0011	+90	+42
183 B. Aurigæ	6.3	1.12	7.6	29 31.3		2 34.2	+ 5 4.7	−0.9774	0.5934	−0.0055	−15	−60
κ Aurigæ	4.4	1.10	7.3	29 32.0		5 58.4	+ 8 20.4	−1.0240	0.5946	0.0167	−19	−60
211 B. Aurigæ	6.3	1.09	7.3	29 35.0		8 9.6	+10 26.1	−1.1180	0.5952	0.0239	−28	−60
49 Aurigæ	5.1	+1.06	+ 7.3	+28 5.6		13 26.6	− 8 30.0	+0.2268	0.5965	−0.0415	+58	− 6

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
53 Aurigæ	5.6	+1.06	+ 7.0	+29 3.7	30 14 37.3	− 7 22.3	−0.8078	0.5967	−0.0454	− 3	−61
54 Aurigæ	5.8	1.05	7.1	28 20.6	15 4.3	− 6 56.4	−0.0988	0.5967	0.0469	+39	−23
28 Geminorum	5.5	+1.05	+ 6.9	+29 3.7	17 0.6	− 5 5.0	−0.9244	0.5969	−0.0533	−11	−61
				NEW	*MOON.*						

AUGUST.

Name.	Mag.	Δα	Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
c Leonis	5.1	+0.96	− 3.1	+ 6 34.1	4 0 15.9	− 1 49.8	+1.4235	0.5454	−0.2845	+90	+54
χ Leonis	4.7	0.98	3.1	7 48.3	2 11.5	+ 0 2.0	−0.3479	0.5445	0.2857	+27	−62
σ Leonis	4.1	+1.02	− 4.0	+ 6 30.3	9 29.0	+ 7 4.5	−1.1622	0.5412	−0.2895	−20	−83
80 Leonis	6.4	1.01	4.7	4 20.3	11 37.8	+ 9 8.9	+0.3590	0.5404	0.2903	+64	−26
83 Leonis	6.3	0.98	4.8	3 29.2	12 4.8	+ 9 35.0	+1.0711	0.5402	0.2904	+90	+14
τ Leonis	5.2	1.01	5.0	3 20.0	12 35.3	+10 4.5	+1.0740	0.5400	0.2906	+90	+14
89 Leonis	5.7	1.03	5.2	3 32.5	15 32.5	−11 4 2	+0.0092	0.5390	0.2915	+45	−43
9 B. Virginis	6.2	+1.04	− 6.6	+ 0 9.8	22 17.6	− 4 32.7	+1.3881	0.5368	−0.2923	+90	+43
β Virginis	3.8	1.11	6.3	2 15.2	23 1.4	− 3 50.4	−0.8994	0.5366	0.2923	− 2	−88
27 B. Virginis	6.5	1.10	6.8	+ 1 0.8	5 2 55.9	− 0 3.6	−0.8110	0.5357	0.2922	+ 3	−89
31 B. Virginis	6.4	1.08	7.5	− 1 17.0	3 50.7	+ 0 49.3	+1.2046	0.5355	0.2921	+89	+23
162 B. Virginis	6.2	1.17	9.3	4 8.2	16 20.0	−11 6.1	+0.4198	0.5337	0.2885	+68	−23
200 B. Virginis	6.3	+1.19	− 9.5	− 4 34.5	18 5.7	− 9 23.9	+0.3506	0.5337	−0.2877	+63	−26
f Virginis	6.0	1.21	10.0	5 21.3	20 29.5	− 7 4.8	+0.4422	0.5336	0.2864	+69	−22
319 B. Virginis	6.3	1.26	10.5	5 49.7	6 1 30.7	− 2 13.7	−0.5140	0.5336	0.2832	+18	−75
49 Virginis	5.2	1.34	12.5	10 16.7	10 57.7	+ 6 54.6	+1.3137	0.5343	0.2757	+80	+35
g Virginis	5.6	1.35	12.0	8 31.3	11 16.4	+ 7 12.7	−0.5401	0.5343	0.2754	+15	−77
50 Virginis	6.2	+1.35	−12.4	− 9 52.1	11 49.7	+ 7 45.0	+0.6630	0.5343	−0.2748	+80	−10
α Virginis	1.2	1.43	13.1	10 42.7	18 58.5	− 9 20.5	−0.4263	0.5356	0.2675	+20	−69
i Virginis	5.7	1.43	13.6	12 15.5	19 40.5	− 8 39.9	+0.9509	0.5358	0.2667	+78	+ 6
550 B. Virginis	6.0	1.48	14.0	12 46.3	23 20.1	− 5 7.7	+0.5032	0.5365	0.2624	+68	−18
621 B. Virginis	6.4	1.66	15.0	14 33.5	7 12 55.5	+ 8 0.3	−1.1283	0.5404	0.2436	−24	−90
214 G. Virginis	6.5	+1.66	−15.5	−15 55.4	13 15.9	+ 8 20.1	+0.1812	0.5406	−0.2431	+48	−35
40 H. Virginis	5.1	1.70	15.5	15 53.7	15 48.1	+10 47.1	−0.4596	0.5414	0.2391	+15	−72
43 H. Virginis	5.5	1.73	16.2	17 48.0	17 50.6	−11 14.6	+1.0008	0.5422	0.2358	+72	+11
231 G. Virginis	6.4	1.74	16.3	18 11.3	18 35.1	−10 31.6	+1.2216	0.5424	0.2346	+72	+29
236 G. Virginis	5.7	1.75	16.4	18 19.1	19 17.6	− 9 50.6	+1.1909	0.5427	0.2334	+72	+26
9 G. Libræ	6.5	+1.87	−17.0	−20 3.8	8 2 31.0	− 2 52.2	+1.3431	0.5455	−0.2207	+70	+47
17 G. Libræ	6.4	1.95	17.3	20 48.7	7 31.9	+ 1 58.2	+1.0336	0.5476	0.2113	+69	+14
18 G. Libræ	6.1	1.96	17.3	20 57.9	7 59.3	+ 2 24.7	+1.0948	0.5478	0.2104	+69	+19
43 B. Libræ	5.7	2.08	18.4	21 1.8	12 26.4	+ 6 42.4	+0.2458	0.5496	0.2014	+46	−31
47 G. Libræ	6.1	2.12	17.4	21 41.9	16 23.9	+10 31.5	+0.1565	0.5512	0.1931	+40	−36
64 G. Libræ	5.8	+2.19	−17.4	−22 5.0	20 42.4	− 9 19.2	−0.2582	0.5531	−0.1839	+19	−60
153 B. Libræ	6.3	2.35	17.8	24 12.0	9 3 53.5	− 2 23.6	+0.6782	0.5561	0.1675	+65	− 7
169 B. Libræ	6.0	2.36	17.2	22 51.5	5 53.8	− 0 27.6	−1.0495	0.5569	0.1627	−28	−90
177 B. Libræ	6.2	2.37	17.2	22 52.3	6 33.6	+ 0 10.7	−1.1442	0.5572	0.1612	−36	−90
42 Libræ	5.0	2.38	17.4	23 32.4	6 56.7	+ 0 32.9	−0.5081	0.5573	0.1603	+ 3	−78
b Scorpii	4.7	+2.49	−17.7	−25 29.6	11 27.7	+ 4 54.1	+0.8296	0.5590	−0.1493	+64	+ 3
A Scorpii	4.6	2.51	17.5	25 4.4	12 34.9	+ 5 58.9	+0.2256	0.5595	0.1465	+39	−32
31 B. Scorpii	5.4	2.50	17.2	24 16.8	12 42.9	+ 6 6.6	−0.6230	0.5595	0.1461	− 4	−89
32 B. Scorpii	5.3	2.49	17.0	23 43.4	12 44.2	+ 6 7.8	−1.2067	0.5595	0.1461	−44	−90
3 Scorpii	5.9	2.51	17.4	24 59.5	13 1.5	+ 6 24.4	+0.0758	0.5596	0.1454	+31	−40
4 Scorpii	5.7	+2.52	−17.7	−26 0.9	13 22.1	+ 6 44.3	+1.0966	0.5597	−0.1445	+64	+23
40 B. Scorpii	5.4	2.54	17.1	24 35.1	14 41.3	+ 8 0.6	−0.5869	0.5602	0.1412	− 3	−85
π Scorpii	3.0	2.56	17.6	25 52.2	14 47.0	+ 8 6.1	+0.7428	0.5602	0.1409	+64	− 3
48 B. Scorpii	4.9	2.59	17.3	25 37.7	16 40.9	+ 9 55.8	+0.2279	0.5609	0.1361	+38	−32
50 B. Scorpii	6.4	2.58	16.9	24 29.5	16 56.2	+10 10.6	−0.9971	0.5610	0.1355	−28	−90
65 B. Scorpii	5.5	+2.64	−17.3	−26 5.9	18 40.7	+11 51.2	+0.4546	0.5616	−0.1310	+50	−19

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. Δα	Red'ns from 1913.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	$\dot{Y}$	x'	y'	N.	S.
		s	″	° ′	d h m	h m				°	°
85 B. Scorpii	6.0	+2.67	−16.7	−25 15.7	**9** 21 31.9	− 9 24.0	−0.7874	0.5625	−0.1236	−16	−90
σ Scorpii	3.1	2.73	16.5	25 23.4	**10** 0 9.8	− 6 51.8	−0.9700	0.5633	0.1166	−28	−90
α Scorpii	1.2	2.80	16.4	26 14.7	3 34.6	− 3 34.6	−0.4541	0.5642	0.1075	+ 1	−74
116 B. Scorpii	6.2	2.82	16.3	26 21.2	4 23.8	− 2 47.3	−0.4265	0.5645	0.1052	+ 2	−72
τ Scorpii	2.9	2.88	16.6	28 2.5	6 14.4	− 1 0.8	+1.1630	0.5649	0.1002	+62	+31
134 B. Scorpii	6.4	+2.93	−15.9	−27 17.9	9 44.5	+ 2 21.5	+0.0457	0.5656	−0.0906	+24	−42
135 B. Scorpii	6.0	2.96	16.2	28 21.2	10 1.1	+ 2 37.4	+1 1349	0.5657	0.0898	+62	+28
95 G. Ophiuchi	6.1	3.14	14.3	27 39.6	21 21.6	−10 27.6	−0.4371	0.5672	0.0580	− 3	−73
43 Ophiuchi	5.4	3.23	13.7	28 3.8	**11** 1 52.0	− 6 7.4	−0.2407	0.5674	0.0451	+ 6	−59
163 G. Ophiuchi	6.3	3.36	12.2	27 50.8	10 6.1	+ 1 48.1	−0.7481	0.5671	0.0215	−23	−90
X Sagittarii (*var.*)	4.4	+3.38	−11.9	−27 48.1	11 52.0	+ 3 30.0	−0.8298	0.5669	−0.0164	−28	−90
10 G. Sagittarii	5.7	3.45	11.1	28 3.3	15 38.7	+ 7 8.2	−0.6019	0.5664	0.0056	−16	−89
210 B. Scorpii	5.8	3.48	11.2	28 45.2	16 26.8	+ 7 54.5	+0.1420	0.5663	−0.0033	+22	−36
W Sagittarii (*var.*)	4.3	3.54	10.9	29 35.3	19 4.5	+10 26.3	+1.0380	0.5658	+0.0042	+60	+20
38 B. Sagittarii	4.7	3.53	10.3	28 28.2	20 22.2	+11 41.1	−0.1521	0.5655	0.0079	+ 7	−54
C. D.−28° 14268	6.4	+3.57	−10.1	−28 55.4	21 58.8	−10 45.9	+0.3507	0.5651	+0.0124	+34	−24
48 G. Sagittarii	6.3	3.59	9.6	28 19.2	**12** 0 15.1	− 8 34.6	−0.2623	0.5645	0.0188	+ 2	−60
62 B. Sagittarii	6.0	3.60	9.6	28 41.1	0 15.3	− 8 34.5	+0.1297	0.5645	0.0188	+22	−37
58 G. Sagittarii	6.1	3.61	9.1	28 28.4	2 10.9	− 6 43.1	−0.0563	0.5640	0.0243	+13	−48
φ Sagittarii	3.3	3.69	6.6	27 5.0	12 10.7	+ 2 54.6	−1.1746	0.5604	0.0518	−49	−90
τ Sagittarii	3.5	+3.81	− 4.8	−27 48.0	21 16.9	+11 41.0	+0.1812	0.5561	+0.0760	+30	−34
183 B. Sagittarii	6.2	3.85	4.9	28 46.4	21 30.6	+11 54.2	+1.2523	0.5560	0.0766	+61	+46
234 B. Sagittarii	5.9	3.88	2.9	28 2.1	**13** 4 54.8	− 4 57.4	+1.0927	0.5520	0.0954	+62	+24
248 B. Sagittarii	5.7	3.88	− 2.2	27 9.9	7 17.4	− 2 39.9	+0.3813	0.5507	0.1012	+43	−23
ω Sagittarii	4.8	3.94	+ 0.5	26 31.9	18 53.9	+ 8 32.5	+1.0289	0.5433	0.1284	+63	+17
A Sagittarii	4.9	+3.94	+ 0.9	−26 25.9	20 19.4	+ 9 55.1	+1.1061	0.5424	+0.1315	+64	+24
36 B. Capricorni	6.2	3.86	4.6	22 40.8	**14** 10 33.1	− 0 19.7	−0.9079	0.5325	0.1610	−18	−90
17 Capricorni	5.8	3.86	6.4	21 49.8	18 30.9	+ 7 22.7	−0.4996	0.5268	0.1759	+ 6	−77
η Capricorni	4.8	3.82	8.3	20 11.8	**15** 3 27.4	− 7 57.5	−0.6524	0.5205	0.1909	0	−90
χ Capricorni	5.3	3.86	8.6	21 32.5	5 29.9	− 5 58.8	+1.2193	0.5190	0.1941	+68	+31
27 Capricorni	6.1	+3.85	+ 8.8	−20 54.2	5 59.7	− 5 29.9	+0.6145	0.5187	+0.1949	+66	−11
φ Capricorni	5.3	3.85	9.4	21 0.6	9 2.6	− 2 32.6	+1.3339	0.5166	0.1996	+69	+47
30 Capricorni	5.4	3.77	9.8	18 20.8	10 14.8	− 1 22.6	−1.3579	0.5158	0.2013	−57	−90
128 B. Capricorni	6.5	3.80	10.9	19 31.5	16 20.9	+ 4 32.4	+1.1945	0.5117	0.2099	+70	+27
γ Capricorni	3.8	3.73	11.9	17 3.1	21 34.6	+ 9 36.8	−0.4176	0.5083	0.2167	+16	−70
δ Capricorni	3.0	+3.72	+12.4	−16 31.1	**16** 1 12.1	−10 52.1	−0.2129	0.5060	+0.2211	+27	−56
152 B. Capricorni	6.5	3.72	12.8	17 14.9	2 52.4	− 9 14.7	+0.9636	0.5050	0.2230	+73	+ 8
ι Aquarii	4.4	3.63	14.2	14 17.3	11 31.2	− 0 50.8	−0.3391	0.4998	0.2323	+22	−64
39 Aquarii	6.2	3.63	14.8	14 37.1	14 44.7	+ 2 17.2	+0.7807	0.4981	0.2354	+75	− 3
42 Aquarii	5.5	3.60	15.1	13 15.7	17 7.6	+ 4 36.1	−0.1586	0.4968	0.2376	+32	−53
45 Aquarii	6.1	+3.60	+15.3	--13 44.2	18 19.2	+ 5 45.7	+0.6520	0.4962	+0.2386	+75	−11
σ Aquarii	4.9	3.52	16.1	11 7.1	**17** 0 43.1	+11 59.0	−0.7048	0.4931	0.2439	+ 5	−90
58 Aquarii	6.4	3.53	16.2	11 20.8	1 17.2	−11 27.8	−0.3130	0.4928	0.2443	+25	−62
λ Aquarii	3.8	3.42	17.5	8 2.3	12 58.2	− 0 5.9	−1.0832	0.4879	0.2520	−16	−90
78 Aquarii	6.3	3.41	17.6	7 39.7	14 4.4	+ 0 58.5	−1.2219	0.4875	0.2526	−27	−90
81 Aquarii	6.4	+3.40	+18.1	− 7 31.4	17 55.6	+ 4 43.5	−0.3986	0.4862	+0.2546	+23	−67
82 Aquarii	6.4	3.38	18.1	7 2.2	18 34.8	+ 5 21.7	−0.7731	0.4860	0.2550	+ 4	−90
h Aquarii	5.4	3.41	18.4	8 9.5	20 3.2	+ 6 47.7	+0.8487	0.4855	0.2556	+82	0
φ Aquarii	4.4	3.35	18.7	6 30.8	**18** 1 16.7	+11 52.8	+0.3634	0.4841	0.2578	+64	−26
96 Aquarii	5.7	3.33	19.0	5 35.7	4 10.5	− 9 17.9	+0.0914	0.4833	0.2588	+49	−40
316 B. Aquarii	6.5	+3.32	+18.8	− 4 23.3	4 40.2	− 8 49.0	−1.1210	0.4832	+0.2590	−18	−90
317 B. Aquarii	6.3	3.33	19.1	6 22.7	4 55.5	− 8 34.2	+1.1555	0.4831	0.2591	+84	+19
337 B. Aquarii	6.4	3.30	19.4	5 0.1	9 59 7	− 3 38.0	+0.9435	0.4821	0.2605	+85	+ 5
342 B. Aquarii	6.5	3.29	19.4	4 33.4	11 8.5	− 2 31.0	+0.7493	0.4819	0.2608	+85	− 6
60 B. Piscium	6.0	3.16	20.0	− 0 22.1	**19** 0 34.7	+10 34.2	−0.3850	0.4804	0.2626	+25	−66
98 B. Piscium	6.3	+3.08	+20.7	+ 1 12.7	13 52.1	− 0 29.2	+1.3475	0.4806	+0.2618	+90	+37

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

The Star's					At Conjunction in R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.		Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$									
		s	″	° ′	d	h m	h m				°	°
60 Piscium	6.2	+2.95	+20.5	+ 6 16.3	20	6 49.7	− 7 58.4	+0.1404	0.4834	+0.2572	+52	−36
62 Piscium	6.1	2 95	20.4	6 49.8		7 19.8	− 7 29.1	−0.3495	0.4836	0.2570	+27	−63
δ Piscium	4.6	2.94	20.3	7 7.0		7 33.2	− 7 16.1	−0.6096	0.4836	0.2569	+13	−80
ι Piscium	4.4	2.90	20.6	7 25.7		15 37.4	+ 0 35.2	+1.1054	0.4860	0.2532	+90	+18
π Piscium	5.6	2.78	19.8	11 42.1	21	10 29.0	− 5 4.2	+1.0466	0.4941	0.2406	+90	+16
20 H^1. Arietis	6.4	+2.68	+18.2	+16 49.3	22	3 35.7	+11 33.3	−0.5964	0.5043	+0.2240	+13	−70
26 Arietis	6.2	2.62	17.2	19 28.5		14 27.3	− 1 54.5	−1.1300	0.5120	0.2108	−21	−71
27 Arietis	6.4	2.61	17.9	17 19.5		14 37.0	− 1 45.1	+1.2498	0.5122	0.2106	+90	+38
μ Arietis	5.7	2.58	17.0	19 38.8		20 18.8	+ 3 46.2	−0.1038	0.5166	0.2027	+39	−40
47 Arietis	5.8	2.54	16.6	20 19.5	23	3 59.2	+11 12.3	+0.6686	0.5228	0.1910	+90	+ 1
ε Arietis (*mean*)	4.6	+2.53	+16.3	+20 59.8		4 32.0	+11 43.9	+0.0435	0.5233	+0.1902	+47	−31
66 Arietis	6.1	2.44	15.2	22 30.5		18 17.9	+ 1 3.0	+0.8614	0.5352	0.1659	+90	+15
7 Tauri	5.9	2.44	14.5	24 10.6		21 1.6	+ 3 41.2	−0.4890	0.5376	0.1606	+18	−56
11 Tauri	6.1	2.42	14.1	25 3.2		23 53.4	+ 6 27.2	−0.9773	0.5403	0.1548	−12	−65
16 Tauri	5.4	2.40	14.3	24 1.2	24	1 43.4	+ 8 13.5	+0.4116	0.5420	0.1511	+70	− 8
17 Tauri	3.8	+2.40	+14.4	+23 50.7		1 45.5	+ 8 15.6	+0.6056	0.5420	+0.1510	+87	+ 2
18 Tauri	5.6	2.40	14.1	24 34.3		1 52.6	+ 8 22.4	−0.1561	0.5420	0.1507	+36	−36
q Tauri	4.3	2.40	14.2	24 11.9		1 54.2	+ 8 23.9	+0.2468	0.5420	0.1506	+59	−16
20 Tauri	4.1	2.40	14.3	24 6.0		2 11.0	+ 8 40.2	+0.3945	0.5423	0.1501	+69	− 9
21 Tauri	5.8	2.40	14.2	24 17.3		2 13.0	+ 8 42.1	+0.1990	0.5423	0.1500	+56	−18
22 Tauri	6.5	+2.40	+14.2	+24 15.7		2 16.8	+ 8 45.8	+0.2368	0.5424	+0.1499	+59	−16
23 Tauri	4.3	2.39	14.4	23 40.9		2 24.8	+ 8 53.5	+0.8778	0.5425	0.1496	+90	+18
η Tauri	3.0	2.39	14.3	23 50.4		2 55.8	+ 9 23.5	+0.7844	0.5429	0.1485	+90	+13
27 Tauri	3.7	2.38	14.3	23 47.5		3 40.9	+10 7.0	+0.9472	0.5436	0.1469	+90	+23
28 Tauri	5.2	2.39	14.3	23 52.5		3 41.5	+10 7.6	+0.8592	0.5436	0.1469	+90	+17
14 H. Tauri	5.3	+2.40	+13.7	+25 19.3		4 10.3	+10 35.4	−0.6198	0.5441	+0.1458	+10	−61
p Tauri	5.6	2.33	12.8	26 15.5		13 10.7	− 4 43.2	−0.3942	0.5521	0.1256	+23	−47
φ Tauri	5.0	2.31	12.2	27 8.8		17 15.9	− 0 46.8	−0.8448	0.5557	0.1159	− 4	−63
χ Tauri	5.3	2.29	12.8	25 25.7		18 14.5	+ 0 9.7	+1.0934	0.5565	0.1134	+90	+37
17 B. Aurigæ	6.0	2.21	10.9	27 45.3	25	6 50.9	−11 42.0	−0.1465	0.5669	0.0807	+36	−29
38 B. Aurigæ	6.5	+2.16	+10.5	+27 34.7		11 41.6	− 7 2.3	+0.3986	0.5706	+0.0672	+70	0
47 B. Aurigæ	6.0	2.15	10.2	27 55.5		13 45.6	− 5 3.0	+0.1676	0.5721	0.0614	+54	−12
354 B. Tauri	6.4	2.10	9.8	27 52.4		18 16.9	− 0 42.3	+0.4688	0.5752	0.0482	+76	+ 6
73 B. Aurigæ	5.8	2.12	9.2	29 29.1		18 20.6	− 0 38.7	−1.2151	0.5752	0.0481	−40	−61
22 Aurigæ	6.4	2.11	9.4	28 51.4		19 13.2	+ 0 11.9	−0.5171	0.5758	0.0455	+15	−47
β Tauri	1.8	+2.10	+ 9.3	+28 32.2		20 23.2	+ 1 19.1	−0.1316	0.5765	+0.0420	+37	−24
107 B. Aurigæ	6.5	2.05	9.2	27 36.5	26	0 13.5	+ 5 0.4	+0.9755	0.5789	0.0305	+90	+36
116 B. Aurigæ	5.9	2.06	8.6	29 10.1		1 31.8	+ 6 15.6	−0.6118	0.5796	0.0265	+ 9	−52
406 B. Tauri	5.6	2.00	8.6	27 56.7		6 7.8	+10 40.7	+0.7488	0.5821	0.0123	+90	+24
136 Tauri	4.6	1.98	8.6	27 35.7		7 3.4	+11 34.1	+1.1218	0.5825	0.0095	+90	+48
154 B. Aurigæ	6.4	+1.99	+ 8.0	+28 55.9		8 17.8	−11 14.5	−0.2550	0.5831	+0.0056	+30	−28
415 B. Tauri	6.1	1.95	8.3	27 34.3		10 3.0	− 9 33.5	+1.1587	0.5839	+0.0001	+90	+52
183 B. Aurigæ	6.3	1.96	7.4	29 31.3		12 6.0	− 7 35.5	−0.8665	0.5848	−0.0064	− 7	−60
κ Aurigæ	4.4	1.93	6.8	29 32.0		15 35.2	− 4 14.7	−0.9170	0.5862	0.0175	−11	−60
211 B. Aurigæ	6.3	1.91	6.8	29 35.0		17 49.6	− 2 5.8	−1.0142	0.5868	0.0246	−18	−60
49 Aurigæ	5.1	+1.85	+ 6.6	+28 5.6		23 14.1	+ 3 5.5	+0.3385	0.5882	−0.0420	+66	0
53 Aurigæ	5.6	1.85	6.2	29 3.7	27	0 26.4	+ 4 14.9	−0.7077	0.5885	0.0459	+ 4	−60
54 Aurigæ	5.8	1.84	6.4	28 20.6		0 54.0	+ 4 41.3	+0.0079	0.5886	0.0473	+45	−17
28 Geminorum	5.5	1.83	5.9	29 3.7		2 53.0	+ 6 35.5	−0.8279	0.5889	0.0537	− 4	−61
47 Geminorum	5.6	1.72	5.3	27 0.1		13 6.2	− 7 36.4	+0.5562	0.5895	0.0865	+84	+ 7
53 Geminorum	5.9	+1.71	+ 4.9	+28 3.1		14 50.1	− 5 56.7	−0.6640	0.5894	−0.0920	+ 7	−59
134 B. Geminorum	6.5	1.69	5.0	26 50.9		15 16.4	− 5 31.5	+0.5159	0.5894	0.0934	+80	+ 4
59 Geminorum	5.7	1.68	4.6	27 48.5		18 8.0	− 2 46.9	−0.7369	0.5892	0.1024	+ 2	−62
ι Geminorum	3.9	1.67	4.4	27 58.4		18 35.1	− 2 20.9	−0.9501	0.5891	0.1038	−12	−62
b^2 Geminorum	5.0	1.66	4.2	28 5.9		20 8.8	− 0 51.0	−1.2409	0.5889	0.1087	−42	−62
υ Geminorum	4.3	+1.63	+ 4.2	+27 5.5		22 30.5	+ 1 24.9	−0.4875	0.5886	−0.1160	+17	−50

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. Δα	Red'ns from 1913.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x′	y′	N.	S.
		s	″	° ′	d h m	h m				°	°
c Geminorum	5.5	+1.59	+ 4.1	+25 59.6	28 1 40.5	+ 4 27.2	+0.2383	0.5879	−0.1257	+59	−13
φ Geminorum	5.0	1.58	3.5	26 59.6	5 16.9	+ 7 54.8	−1.2405	0.5871	0.1365	−40	−63
ω Cancri	5.9	1.53	3.4	25 38.0	8 10.6	+10 41.4	−0.2798	0.5862	0.1451	+29	−41
4 Cancri	6.2	1.52	3.5	25 19.8	8 29.5	+10 59.6	−0.0225	0.5861	0.1460	+43	−28
ψ Cancri	5.9	1.50	2.8	25 46.4	11 52.7	− 9 45.3	−0.9762	0.5850	0.1558	−13	−64
35 B. Cancri	6.4	+1.47	+ 3.3	+23 24.1	13 10.3	− 8 30.9	+1.1952	0.5845	−0.1595	+90	+42
λ Cancri	5.9	1.46	2.8	24 17.9	15 50.0	− 5 57.6	−0.1370	0.5835	0.1669	+37	−36
28 Cancri	6.1	1.44	2.4	24 26.1	19 0.2	− 2 55.0	−0.8161	0.5822	0.1756	− 1	−66
υ¹ Cancri	5.7	1.43	2.3	24 22.5	20 8.8	− 1 49.1	−0.9590	0.5817	0.1787	−11	−66
υ² Cancri	6.4	1.43	2.2	24 22.9	20 44.0	− 1 15.3	−1.0705	0.5814	0.1803	−19	−66
γ Cancri	4.7	+1.36	+ 2.2	+21 47.0	29 0 50.3	+ 2 41.3	+0.7565	0.5796	−0.1909	+90	+ 8
				NEW	*MOON.*						
SEPTEMBER.											
f Virginis	6.0	+1.05	− 8.8	− 5 21.3	2 5 39.6	+ 3 53.2	+0.3422	0.5424	−0.2921	+63	−27
319 B. Virginis	6.3	1.08	9.3	5 49.7	10 31.4	+ 8 35.0	−0.6046	0.5426	0.2890	+12	−82
49 Virginis	5.2	1.11	10.9	10 16.7	19 40.2	− 6 35.0	+1.1879	0.5436	0.2813	+80	+23
g Virginis	5.6	1.13	10.6	8 31.3	19 58.3	− 6 17.4	−0.6377	0.5436	0.2810	+10	−85
50 Virginis	6.2	+1.12	−10.9	− 9 52.1	20 30.5	− 5 46.3	+0.5464	0.5437	−0.2804	+73	−17
α Virginis	1.2	1.18	11.6	10 42.6	3 3 25.3	+ 0 54.2	−0.5307	0.5450	0.2729	+15	−77
i Virginis	5.7	1.17	12.0	12 15.5	4 5.9	+ 1 33.4	+0.8246	0.5452	0.2721	+78	− 1
550 B. Virginis	6.0	1.21	12.3	12 46.3	7 38.3	+ 4 58.4	+0.3818	0.5460	0.2676	+61	−25
621 B. Virginis	6.4	1.35	13.4	14 33.5	20 46.9	− 6 20.6	−1.2305	0.5497	0.2483	−33	−90
214 G. Virginis	6.5	+1.35	−13.8	−15 55.4	21 6.7	− 6 1.4	+0.0590	0.5498	−0.2477	+41	−41
40 H. Virginis	5.1	1.38	13.9	15 53.7	23 34.0	− 3 39.3	−0.5730	0.5506	0.2436	+ 9	−81
43 H. Virginis	5.5	1.40	14.5	17 48.0	4 1 32.5	− 1 45.0	+0.8648	0.5512	0.2401	+72	+ 2
231 G. Virginis	6.4	1.41	14.6	18 11.1	2 15.6	− 1 3.5	+1.0821	0.5515	0.2389	+72	+17
236 G. Virginis	5.7	1.41	14.7	18 19.0	2 56.8	− 0 23.7	+1.0518	0.5517	0.2377	+72	+15
9 G. Libræ	6.5	+1.52	−15.4	−20 3.7	9 56.6	+ 6 21.0	+1.2008	0.5542	−0.2245	+70	+28
17 G. Libræ	6.4	1.58	15.8	20 48.7	14 48.4	+11 2.3	+0.8956	0.5560	0.2147	+69	+ 5
18 G. Libræ	6.1	1.59	15.8	20 57.9	15 15.0	+11 28.0	+0.9559	0.5561	0.2138	+69	+ 9
43 B. Libræ	5.7	1.71	17.0	21 1.7	19 34.2	− 8 22.2	+0.1188	0.5576	0.2045	+39	−38
47 G. Libræ	6.1	1.73	16.1	21 41.9	23 25.0	− 4 39.9	+0.0306	0.5591	0.1960	+34	−43
64 G. Libræ	5.8	+1.79	−16.1	−22 4.9	5 3 36.3	− 0 37.7	−0.3784	0.5606	−0.1864	+12	−68
153 B. Libræ	6.3	1.92	16.7	24 12.0	10 36.1	+ 6 6.6	+0.5468	0.5629	0.1695	+59	−15
169 B. Libræ	6.0	1.95	16.2	22 51.5	12 33.4	+ 7 59.6	−1.1595	0.5635	0.1646	−37	−90
177 B. Libræ	6.2	1.96	16.1	22 52.2	13 12.3	+ 8 37.0	−1.2529	0.5638	0.1630	−47	−90
42 Libræ	5.0	1.97	16.3	23 32.4	13 34.8	+ 8 58.6	−0.6245	0.5639	0.1621	− 3	−89
b Scorpii	4.7	+2.07	−16.8	−25 29.5	17 59.2	−10 46.8	+0.6982	0.5652	−0.1507	+64	− 6
A Scorpii	4.6	2.08	16.6	25 4.4	19 5.0	− 9 43.5	+0.1015	0.5655	0.1479	+32	−39
31 B. Scorpii	5.4	2.08	16.3	24 16.8	19 12.7	− 9 36.0	−0.7374	0.5655	0.1476	−10	−90
32 B. Scorpii	5.3	2.09	16.1	23 43.4	19 14.0	− 9 34.8	−1.3145	0.5655	0.1475	−62	−90
3 Scorpii	5.9	2.09	16.6	24 59.5	19 31.0	− 9 18.5	−0.0466	0.5656	0.1468	+25	−47
4 Scorpii	5.7	+2.10	−16.9	−26 0.9	19 51.1	− 8 59.1	+0.9627	0.5657	−0.1459	+64	+12
40 B. Scorpii	5.4	2.12	16.3	24 35.1	21 8.5	− 7 44.6	−0.7014	0.5660	0.1425	− 9	−90
π Scorpii	3.0	2.13	16.8	25 52.1	21 14.1	− 7 39.2	+0.6134	0.5661	0.1423	+60	−10
48 B. Scorpii	4.9	2.16	16.6	25 37.7	23 5.5	− 5 52.0	+0.1047	0.5665	0.1373	+32	−39
50 B. Scorpii	6.4	2.16	16.1	24 29.5	23 20.4	− 5 37.7	−1.1069	0.5666	0.1366	−36	−90
65 B. Scorpii	5.5	+2.21	−16.6	−26 5.9	6 1 2.7	− 3 59.3	+0.3296	0.5670	−0.1320	+43	−26
85 B. Scorpii	6.0	2.25	16.1	25 15.7	3 50.4	− 1 18.0	−0.8987	0.5676	0.1244	−22	−90
σ Scorpii	3.1	2.30	15.9	25 23.4	6 25.1	+ 1 11.0	−1.0790	0.5681	0.1174	−36	−90
α Scorpii	1.2	2.38	15.9	26 14.7	9 46.0	+ 4 24.2	−0.5675	0.5687	0.1080	− 5	−84
116 B. Scorpii	6.2	2.39	15.9	26 21.2	10 34.4	+ 5 10.7	−0.5400	0.5688	0.1058	− 4	−82
τ Scorpii	2.9	+2.45	−16.3	−28 2.5	12 23.0	+ 6 55.2	+1.0353	0.5691	−0.1007	+62	+19

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. Δα	Red'ns from 1913.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x′	y′	N.	S.
		s	″	° ′	d h m	h m				°	°
134 B. Scorpii	6.4	+2.51	−15.7	−27 17.9	6 15 49.5	+10 13.9	−0.0705	0.5695	−0.0909	+19	−49
135 B. Scorpii	6.0	2.53	16.0	28 21 2	16 5.9	+10 29.6	+1.0092	0.5695	0.0901	+62	+17
95 G. Ophiuchi	6.1	2.74	14.5	27 39.6	7 3 16.5	− 2 45.3	−0.5454	0.5697	0.0578	− 9	−83
43 Ophiuchi	5.4	2.83	14.0	28 3.8	7 43.7	+ 1 31.8	−0.3488	0.5695	0.0448	0	−67
163 G. Ophiuchi	6.3	2.98	12.7	27 50.8	15 52.8	+ 9 22.2	−0.8499	0.5683	0.0210	−29	−90
X Sagittarii (*var.*)	4.4	+3.01	−12.4	−27 48.1	17 37.9	+11 3.4	−0.9305	0.5680	−0.0160	−34	−90
10 G. Sagittarii	5.7	3.09	11.8	28 3.3	21 22.8	− 9 20.3	−0.7023	0.5670	0.0051	−22	−90
210 B. Scorpii	5.8	3.12	11.9	28 45.2	22 10.5	− 8 34.4	+0.0382	0.5668	−0.0029	+16	−42
W Sagittarii (*var.*)	4.3	3.18	11.7	29 35.3	8 0 47.3	− 6 3.5	+0.9313	0.5661	+0.0047	+60	+12
38 B. Sagittarii	4.7	3.18	11.1	28 28.2	2 4.5	− 4 49.2	−0.2527	0.5657	0.0084	+ 2	−60
C. D.−28° 14268	6.4	+3.22	−11.0	−28 55.4	3 40.6	− 3 16.7	+0.2487	0.5652	+0.0130	+29	−30
48 G. Sagittarii	6.3	3.24	10.5	28 19.2	5 56.2	− 1 6.1	−0.3605	0.5644	0.0194	− 3	−67
62 B. Sagittarii	6.0	3.25	10.4	28 41.1	5 56.4	− 1 5.9	+0.0300	0.5644	0.0194	+17	−43
58 G. Sagittarii	6.1	3.28	10.0	28 28.4	7 51.5	+ 0 44.8	−0.1544	0.5636	0.0248	+ 9	−54
φ Sagittarii	3.3	3.39	7.6	27 5.0	17 49.6	+10 20.8	−1.2644	0.5593	0.0524	−60	−90
τ Sagittarii	3.5	+3.54	− 6.1	−27 48.0	9 2 55.6	− 4 52.9	+0.0932	0.5545	+0.0764	+26	−39
183 B. Sagittarii	6.2	3.58	6.2	28 46.4	3 9.3	− 4 39.7	+1.1625	0.5544	0.0770	+61	+32
234 B. Sagittarii	5.9	3.65	4.4	28 2.1	10 34.2	+ 2 29.4	+1.0084	0.5499	0.0957	+62	+16
248 B. Sagittarii	5.7	3.65	3.6	27 9.9	12 57.0	+ 4 47.1	+0.2992	0.5484	0.1015	+39	−28
ω Sagittarii	4.8	3.77	0.8	26 31.9	10 0 35.9	− 7 58.1	+0.9545	0.5407	0.1285	+63	+12
A Sagittarii	4.9	+3.77	− 0.5	−26 25.9	2 1.7	− 6 35.2	+1.0327	0.5397	+0.1316	+64	+17
36 B. Capricorni	6.2	3.78	+ 3.5	22 40.8	16 19.8	+ 7 14.5	−0.9722	0.5297	0.1610	−22	−90
17 Capricorni	5.8	3.81	5.4	21 49.8	11 0 20.3	− 9 0.4	−0.5580	0.5240	0.1757	+ 3	−82
η Capricorni	4.8	3.81	7.5	20 11.9	9 20.0	− 0 17.6	−0.7045	0.5178	0.1908	− 2	−90
χ Capricorni	5.3	3.86	7.7	21 32.5	11 23.3	+ 1 42.0	+1.1711	0.5164	0.1940	+68	+26
27 Capricorni	6.1	+3.85	+ 7.8	−20 54.2	11 53.3	+ 2 11.1	+0.5659	0.5161	+0.1947	+64	−14
φ Capricorni	5.3	3.86	8.5	21 0.7	14 57.3	+ 5 9.4	+1.2885	0.5140	0.1994	+69	+39
128 B. Capricorni	6.5	3.85	10.2	19 31.5	22 18.2	−11 42.9	+1.1547	0.5092	0.2097	+70	+23
γ Capricorni	3.8	3.81	11.6	17 3.1	12 3 33.7	− 6 36.6	−0.4556	0.5060	0.2166	+14	−72
δ Capricorni	3.0	3.81	12.1	16 31.2	7 12.4	− 3 4.3	−0.2477	0.5039	0.2210	+25	−58
152 B. Capricorni	6.5	+3.82	+12.5	−17 14.9	8 53.3	− 1 26.3	+0.9316	0.5029	+0.2230	+73	+ 6
ι Aquarii	4.4	3.77	14.4	14 17.3	17 34.6	+ 7 0.1	−0.3661	0.4982	0.2323	+21	−66
39 Aquarii	6.2	3.78	14.9	14 37.1	20 49.0	+10 9.0	+0.7577	0.4966	0.2355	+75	− 5
42 Aquarii	5.5	3.75	15.5	13 15.7	23 12.5	−11 31.5	−0.1811	0.4954	0.2377	+31	−54
45 Aquarii	6.1	3.77	15.6	13 44.2	13 0 24.4	−10 21.6	+0.6315	0.4948	0.2387	+75	−12
σ Aquarii	4.9	+3.71	+16.8	−11 7.1	6 49.7	− 4 7.0	−0.7219	0.4919	+0.2440	+ 5	−90
58 Aquarii	6.4	3.72	16.9	11 20.8	7 24.0	− 3 33 6	−0.3293	0.4917	0.2445	+25	−63
λ Aquarii	3.8	3.66	18.8	8 2.3	19 6.8	+ 7 50.1	−1.0912	0.4874	0.2525	−17	−90
78 Aquarii	6.3	3.65	18.9	7 39.7	20 13.2	+ 8 54.7	−1.2292	0.4870	0.2531	−27	−90
81 Aquarii	6.4	3.65	19.4	7 31.4	14 0 4.9	−11 19.7	−0.4023	0.4859	0.2552	+23	−68
82 Aquarii	6.4	+3.65	+19.5	− 7 2.2	0 44.1	−10 41.6	−0.7766	0.4857	+0.2555	+ 3	−90
h Aquarii	5.4	3.68	19.7	8 9.5	2 12.6	− 9 15.4	+0.8477	0.4853	0.2562	+82	0
φ Aquarii	4.4	3.64	20.2	6 30.8	7 26.5	− 4 9.9	+0.3657	0.4840	0.2585	+64	−26
96 Aquarii	5.7	3.63	20.7	5 35.6	10 20.5	− 1 20.4	+0.0955	0.4834	0.2596	+49	−40
316 B. Aquarii	6.5	3.62	20.7	4 23.2	10 50.2	− 0 51.5	−1.1175	0.4833	0.2598	−17	−90
317 B. Aquarii	6.3	+3.63	+20.7	− 6 22.6	11 5.4	− 0 36.8	+1.1610	0.4832	+0.2598	+84	+20
337 B. Aquarii	6.4	3.62	21.2	5 0.0	16 9.7	+ 4 19.6	+0.9522	0.4824	0.2614	+85	+ 6
342 B. Aquarii	6.5	3.61	21.3	4 33.4	17 18.5	+ 5 26.5	+0.7587	0.4822	0.2616	+80	− 6
60 B. Piscium	6.0	3.54	22.6	− 0 22.1	15 6 44.3	− 5 28.8	−0.3678	0.4812	0.2636	+26	−65
98 B. Piscium	6.3	3.51	23.5	+ 1 12.7	20 0.5	+ 7 26.6	+1.3735	0.4818	0.2630	+90	+40
60 Piscium	6.2	+3.45	+24.0	+ 6 16.4	16 12 56.3	− 0 4.4	+0.1736	0.4848	+0.2584	+54	−35
62 Piscium	6.1	3.45	23.9	6 49.9	13 26.4	+ 0 25.0	−0.3167	0.4850	0.2582	+28	−61
δ Piscium	4.6	3.45	23.8	7 7.1	13 39.8	+ 0 38.0	−0.5771	0.4850	0.2581	+15	−77
ε Piscium	4.4	3.43	24.1	7 25.7	21 43.2	+ 8 28.5	+1.1435	0.4874	0.2543	+90	+20
π Piscium	5.6	3.38	23.7	11 42.2	17 16 34.0	+ 2 48.3	+1.0914	0.4952	0.2413	+90	+19
20 H¹. Arietis	6.4	+3.37	+22.3	+16 49.4	18 9 42.3	− 4 32.8	−0.5534	0.5046	+0.2244	+16	−68

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

The Star's						At Conjunction in R. A.					Limiting Parallels.	
Name.		Mag.	Red'ns from 1913.0. $\Delta\alpha$	$\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
			s	″	° ′	d h m	h m				°	°
26	Arietis	6.2	+3.35	+21.4	+19 28.5	18 20 36.6	+ 6 2.2	−1.0894	0.5117	+0.2108	−18	−71
27	Arietis	6.4	3.33	21.9	17 19.5	20 46.4	+ 6 11.7	+1.3021	0.5118	0.2105	+90	+44
μ	Arietis	5.7	3.33	21.1	19 38.8	19 2 30.3	+11 45.2	−0.0579	0.5160	0.2025	+41	−38
47	Arietis	5.8	3.32	20.4	20 19.6	10 14.2	− 4 45.3	+0.7194	0.5215	0.1906	+90	+ 3
ε	Arietis (*mean*)	4.6	3.32	20.2	20 59.9	10 47.3	− 4 13.2	+0.0903	0.5219	0.1897	+50	−28
66	Arietis	6.1	+3.28	+18.7	+22 30.6	20 0 41.9	+ 9 14.5	+0.9142	0.5326	+0.1650	+90	+18
7	Tauri	5.9	3.29	18.0	24 10.7	3 27.8	+11 55.0	−0.4475	0.5348	0.1597	+20	−53
11	Tauri	6.1	3.29	17.4	25 3.2	6 22.0	− 9 16.7	−0.9403	0.5371	0.1538	−10	−65
16	Tauri	5.4	3.26	17.5	24 1.3	8 13.6	− 7 28.8	+0.4604	0.5385	0.1500	+74	− 5
17	Tauri	3.8	3.26	17.6	23 50.7	8 15.7	− 7 26.8	+0.6561	0.5386	0.1500	+90	+ 5
18	Tauri	5.6	+3.27	+17.4	+24 34.3	8 22.9	− 7 19.8	−0.1123	0.5386	+0.1497	+38	−34
q	Tauri	4.3	3.26	17.5	24 12.0	8 24.5	− 7 18.3	+0.2942	0.5387	0.1497	+62	−14
20	Tauri	4.1	3.26	17.5	24 6.1	8 41.5	− 7 1.9	+0.4432	0.5389	0.1491	+73	− 6
21	Tauri	5.8	3.26	17.4	24 17.3	8 43.6	− 6 59.9	+0.2460	0.5389	0.1490	+59	−16
22	Tauri	6.5	3.26	17.4	24 15.7	8 47.4	− 6 56.2	+0.2841	0.5390	0.1489	+62	−14
23	Tauri	4.3	+3.25	+17.6	+23 41.0	8 55.6	− 6 48.2	+0.9309	0.5390	+0.1486	+90	+21
η	Tauri	3.0	3.25	17.5	23 50.5	9 27.0	− 6 17.9	+0.8365	0.5395	0.1475	+90	+16
27	Tauri	3.7	3.25	17.4	23 47.6	10 12.8	− 5 33.6	+1.0008	0.5401	0.1459	+90	+26
28	Tauri	5.2	3.25	17.4	23 52.6	10 13.4	− 5 33.1	+0.9120	0.5401	0.1458	+90	+21
14 H.	Tauri	5.3	3.27	16.8	25 19.3	10 42.7	− 5 4.7	−0.5805	0.5405	0.1448	+12	−59
p	Tauri	5.6	+3.23	+15.5	+26 15.5	19 52.2	+ 3 45.8	−0.3545	0.5475	+0.1245	+25	−44
φ	Tauri	5.0	3.22	14.7	27 8.8	21 0 2.0	+ 7 46.8	−0.8107	0.5507	0.1147	− 2	−63
χ	Tauri	5.3	3.19	15.2	25 25.7	1 1.8	+ 8 44.6	+1.1482	0.5514	0.1123	+90	+41
5 B.	Aurigæ	5.7	3.19	13.1	28 27.0	9 2.9	− 7 31.6	−1.2695	0.5572	0.0923	−49	−62
17 B.	Aurigæ	6.0	3.14	12.7	27 45.4	13 54.6	− 2 50.6	−0.1077	0.5605	0.0796	+38	−27
38 B.	Aurigæ	6.5	+3.10	+12.0	+27 34.7	18 52.4	+ 1 56.2	+0.4433	0.5636	+0.0663	+74	+ 3
47 B.	Aurigæ	6.0	3.09	11.6	27 55.5	20 59.5	+ 3 58.5	+0.2089	0.5649	0.0604	+57	− 9
354 B.	Tauri	6.4	3.05	10.9	27 52.4	22 1 37.9	+ 8 26.4	+0.5132	0.5675	0.0474	+80	+ 9
73 B.	Aurigæ	5.8	3.09	10.3	29 29.1	1 41.7	+ 8 30.1	−1.1931	0.5676	0.0473	−37	−61
22	Aurigæ	6.4	3.06	10.4	28 51.5	2 35.7	+ 9 22.0	−0.4860	0.5681	0.0447	+17	−45
β	Tauri	1.8	+3.05	+10.2	+28 32.3	3 47.5	+10 31.1	−0.0956	0.5687	+0.0412	+39	−22
107 B.	Aurigæ	6.5	2.99	10.0	27 36.5	7 44.2	− 9 41.2	+1.0258	0.5706	0.0298	+90	+40
116 B.	Aurigæ	5.9	3.01	9.3	29 10.1	9 4.8	− 8 23.7	−0.5837	0.5713	0.0259	+11	−50
406 B.	Tauri	5.6	2.94	9.0	27 56.7	13 48.7	− 3 50.8	+0.7951	0.5733	0.0119	+90	+27
136	Tauri	4.6	2.92	8.9	27 35.7	14 46.0	− 2 55.7	+1.1731	0.5737	0.0091	+90	+53
154 B.	Aurigæ	6.4	+2.93	+ 8,2	+28 55.9	16 2.6	− 1 42.1	−0.2237	0.5742	+0.0053	+32	−26
415 B.	Tauri	6.1	2.89	8.4	27 34.3	17 50.9	+ 0 2.0	+1.2100	0.5748	−0.0002	+90	+56
183 B.	Aurigæ	6.3	2.91	7.4	29 31.3	19 57.6	+ 2 3.8	−0.8450	0.5755	0.0065	− 6	−60
κ	Aurigæ	4.4	2.87	6.6	29 32.0	23 33.3	+ 5 31.1	−0.8972	0.5766	0.0174	− 9	−60
211 B.	Aurigæ	6.3	2.85	6.4	29 35.0	23 1 52.0	+ 7 44.4	−0.9967	0.5771	0.0245	−17	−60
49	Aurigæ	5.1	+2.75	+ 6.0	+28 5.6	7 26.8	−10 54.0	+0.3749	0.5782	−0.0416	+69	+ 2
53	Aurigæ	5.6	2.76	5.4	29 3.7	8 41.5	− 9 42.2	−0.6873	0.5784	0.0454	+ 5	−59
54	Aurigæ	5.8	2.74	5.6	28 20.5	9 9.9	− 9 14.9	+0.0389	0.5785	0.0468	+47	−16
28	Geminorum	5.5	2.73	5.0	29 3.7	11 12.8	− 7 16.9	−0.8101	0.5787	0.0530	− 3	−61
47	Geminorum	5.6	2.56	3.9	27 0.1	21 46.4	+ 2 51.8	+0.5923	0.5790	0.0852	+87	+ 9
53	Geminorum	5.9	+2.57	+ 3.2	+28 3.0	23 33.7	+ 4 34.8	−0.6469	0.5789	−0.0906	+ 8	−58
134 B.	Geminorum	6.5	2.54	3.5	26 50.9	24 0 0.9	+ 5 0.9	+0.5509	0.5789	0.0920	+83	+ 6
59	Geminorum	5.7	2.52	2.8	27 48.5	2 58.2	+ 7 51.2	−0.7218	0.5786	0.1008	+ 3	−62
ι	Geminorum	3.9	2.51	2.6	27 58.4	3 26.2	+ 8 18.1	−0.9384	0.5786	0.1022	−11	−62
b^2	Geminorum	5.0	2.50	2.3	28 5.8	5 3.1	+ 9 51.2	−1.2340	0.5784	0.1070	−40	−62
υ	Geminorum	4.3	+2.45	+ 2.2	+27 5.4	7 29.5	−11 48.2	−0.4697	0.5780	−0.1142	+18	−49
c	Geminorum	5.5	2.39	2.0	25 59.5	10 45.8	− 8 39.6	+0.2668	0.5774	0.1237	+61	−11
φ	Geminorum	5.0	2.36	1.1	26 59.5	14 29.4	− 5 4.7	−1.2356	0.5766	0.1344	−39	−63
ω	Cancri	5.9	2.30	1.1	25 37.9	17 28.9	− 2 12.2	−0.2614	0.5758	0.1428	+30	−40
4	Cancri	6.2	2.29	1.1	25 19.8	17 48.4	− 1 53.5	−0.0004	0.5757	0.1437	+44	−27
ψ	Cancri	5.9	+2.26	+ 0.2	+25 46.3	21 18.2	+ 1 28.1	−0.9686	0.5747	−0.1534	−12	−64

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. Δα	Red'ns from 1913.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle. *H*	*Y*	*x'*	*y'*	N.	S.
		s	″	° ′	d h m	h m				°	°
35 B. Cancri	6.4	+2.19	+ 1.0	+23 24.0	24 22 38.4	+ 2 45.2	+1.2336	0.5743	−0.1570	+90	+46
λ Cancri	5.9	2.18	+ 0.2	24 17.8	25 1 23.2	+ 5 23.6	−0.1184	0.5734	0.1643	+38	−35
28 Cancri	6.1	2.14	− 0.3	24 26.0	4 39.3	+ 8 32.2	−0.8077	0.5723	0.1729	− 1	−66
υ^1 Cancri	5.7	2.13	0.5	24 22.5	5 50.1	+ 9 40.3	−0.9529	0.5719	0.1760	−10	−66
υ^2 Cancri	6.4	2.12	0.6	24 22.9	6 26.5	+10 15.3	−1.0660	0.5716	0.1775	−19	−66
γ Cancri	4.7	+2.02	− 0.4	+21 46.9	10 40.3	− 9 40.6	+0.7846	0.5700	−0.1881	+90	+ 9
8 Leonis	5.9	1.71	2.3	16 49.6	26 9 5.7	+11 54.5	+0.9429	0.5606	0.2373	+90	+13
34 Leonis	6.4	1.54	3.6	13 47.0	23 56.4	+ 2 12.9	+0.2415	0.5546	0.2624	+58	−28
37 Leonis	5.5	+1.53	− 4.0	14 9.7	27 2 7.6	+ 4 19.4	−0.7088	0.5538	0.2656	+ 8	−76
VENUS	−3.4	....	....	+11 45.0	3 26.0	+ 5 35.1	+1.3270	0.5074	−0.2518	+90	+39
				NEW	*MOON.*						

OCTOBER.

Name.	Mag.	Δα	Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle. *H*	*Y*	*x'*	*y'*	N.	S.
231 G. Virginis	6.4	+1.20	−13.0	−18 11.1	1 12 7.1	+10 36.1	+1.0716	0.5605	−0.2427	+72	+16
236 G. Virginis	5.7	1.21	13.1	18 19.0	12 47.1	+11 14.7	+1.0416	0.5608	0.2414	+72	+14
9 G. Libræ	6.5	1.27	13.7	20 3.7	19 34.4	− 6 13.1	+1.1888	0.5637	0.2282	+70	+26
17 G. Libræ	6.4	1.32	14.1	20 48.7	2 0 17.2	− 1 40.9	+0.8883	0.5657	0.2183	+69	+ 4
18 G. Libræ	6.1	1.32	14.1	20 57.9	0 42.9	− 1 16.1	+0.9478	0.5659	0.2174	+69	+ 8
43 B. Libræ	5.7	+1.43	−15.5	−21 1.7	4 54.0	+ 2 45.6	+0.1231	0.5678	−0.2081	+39	−38
47 G. Libræ	6.1	1.42	14.4	21 41.9	8 37.4	+ 6 20.5	+0.0369	0.5692	0.1994	+34	−42
64 G. Libræ	5.8	1.47	14.5	22 4.9	12 40.7	+10 14.6	−0.3655	0.5707	0.1896	+13	−67
153 B. Libræ	6.3	1.57	15.0	24 11.9	19 26.9	− 7 14.7	+0.5472	0.5731	0.1724	+59	−15
169 B. Libræ	6.0	1.59	14.7	22 51.5	21 20.4	− 5 25.6	−1.1333	0.5737	0.1674	−35	−90
177 B. Libræ	6.2	+1.60	−14.7	−22 52.2	21 58.0	− 4 49.5	−1.2252	0.5739	−0.1658	−44	−90
42 Libræ	5.0	1.61	14.8	23 32.4	22 19.8	− 4 28.5	−0.6062	0.5740	0.1648	− 2	−87
b Scorpii	4.7	1.68	15.3	25 29.5	3 2 35.8	− 0 22.4	+0.6976	0.5753	0.1533	+64	− 6
A Scorpii	4.6	1.70	15.1	25 4.3	3 39.4	+ 0 38.8	+0.1099	0.5755	0.1504	+33	−38
31 B. Scorpii	5.4	1.70	14.9	24 16.7	3 46.9	+ 0 46.0	−0.7164	0.5756	0.1500	− 9	−90
32 B. Scorpii	5.3	+1.70	−14.7	−23 43.4	3 48.1	+ 0 47.1	−1.2848	0.5755	−0.1500	−54	−90
3 Scorpii	5.9	1.70	15.1	24 59.4	4 4.5	+ 1 2.9	−0.0359	0.5756	0.1492	+25	−47
4 Scorpii	5.7	1.71	15.4	26 0.9	4 24.0	+ 1 21.6	+0.9584	0.5757	0.1483	+64	+12
40 B. Scorpii	5.4	1.73	14.9	24 35.1	5 38.9	+ 2 33.6	−0.6805	0.5760	0.1448	− 8	−90
π Scorpii	3.0	1.73	15.3	25 52.1	5 44.3	+ 2 38.8	+0.6146	0.5761	0.1446	+60	−10
48 B. Scorpii	4.9	+1.76	−15.1	−25 37.7	7 32.3	+ 4 22.6	+0.1138	0.5765	−0.1395	+32	−38
50 B. Scorpii	6.4	1.76	14.8	24 29.5	7 46.6	+ 4 36.4	−1.0796	0.5765	0.1388	−34	−90
65 B. Scorpii	5.5	1.80	15.1	26 5.9	9 25.7	+ 6 11.5	+0.3356	0.5769	0.1342	+43	−26
85 B. Scorpii	6.0	1.84	14.8	25 15.7	12 8.0	+ 8 47.6	−0.8739	0.5774	0.1264	−21	−90
σ Scorpii	3.1	1.88	14.7	25 23.3	14 37.9	+11 11.6	−1.0511	0.5778	0.1192	−34	−90
α Scorpii	1.2	+1.94	−14.8	−26 14.6	17 52.6	− 9 41.4	−0.5467	0.5782	−0.1097	− 4	−82
116 B. Scorpii	6.2	1.95	14.7	26 21.2	18 39.5	− 8 56.3	−0.5194	0.5783	0.1074	− 3	−80
τ Scorpii	2.9	2.00	15.1	28 2.4	20 24.7	− 7 15.2	+1.0332	0.5784	0.1022	+62	+19
134 B. Scorpii	6.4	2.05	14.6	27 17.9	23 45.1	− 4 2.7	−0.0559	0.5786	0.0922	+19	−48
135 B. Scorpii	6.0	2.07	14.9	28 21.1	4 0 1.0	− 3 47.5	+1.0085	0.5786	0.0914	+62	+17
95 G. Ophiuchi	6.1	+2.26	−13.8	−27 39.5	10 52.3	+ 6 38.2	−0.5223	0.5781	−0.0585	− 8	−81
43 Ophiuchi	5.4	2.35	13.4	28 3.8	15 12.1	+10 47.8	−0.3276	0.5774	0.0453	+ 1	−65
163 G. Ophiuchi	6.3	2.49	12.4	27 50.8	23 8.6	− 5 34.4	−0.8213	0.5755	0.0212	−27	−90
X Sagittarii (*var.*)	4.4	2.52	12.1	27 48.1	5 0 51.1	− 3 55.7	−0.9007	0.5750	0.0160	−32	−90
10 G. Sagittarii	5.7	2.60	11.7	28 3.3	4 30.7	− 0 24.7	−0.6749	0.5737	0.0050	−20	−90
210 B. Scorpii	5.8	+2.63	−11.8	−28 45.2	5 17.3	+ 0 20.1	+0.0568	0.5734	−0.0027	+17	−41
W Sagittarii (*var.*)	4.3	2.69	11.8	29 35.3	7 50.4	+ 2 47.3	+0.9399	0.5724	+0.0049	+60	+12
38 B. Sagittarii	4.7	2.69	11.2	28 28.2	9 5.9	+ 3 59.9	−0.2301	0.5719	0.0086	+ 3	−59
C. D. −28° 14268	6.4	2.72	11.1	28 55.4	10 39.9	+ 5 30.3	+0.2659	0.5712	0.0133	+29	−29
48 G. Sagittarii	6.3	2.76	10.7	28 19.2	12 52.6	+ 7 37.9	−0.3361	0.5702	0.0197	− 2	−66
62 B. Sagittarii	6.0	+2.76	−10.6	−28 41.1	12 52.8	+ 7 38.1	+0.0499	0.5701	+0.0197	+18	−42

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
58 G. Sagittarii	6.1	+2.79	−10.3	−28 28.4	5 14 45.6	+ 9 26.6	−0.1321	0.5692	+0.0252	+ 9	−52
φ Sagittarii	3.3	2.92	8.1	27 5.0	6 0 32.3	− 5 8.9	−1.2298	0.5638	0.0529	−55	−90
τ Sagittarii	3.5	3.08	7.0	27 48.0	9 29.3	+ 3 28.3	+0.1157	0.5580	0.0770	+27	−38
183 B. Sagittarii	6.2	3.12	7.1	28 46.4	9 42.8	+ 3 41.3	+1.1756	0.5578	0.0776	+61	+33
234 B. Sagittarii	5.9	3.20	5.4	28 2.2	17 1.5	+10 44.2	+1.0246	0.5527	0.0963	+62	+18
248 B. Sagittarii	5.7	+3.22	− 4.7	−27 9.9	19 22.6	−10 59.7	+0.3215	0.5510	+0.1020	+40	−26
ω Sagittarii	4.8	3.36	2.2	26 31.9	7 6 54.1	+ 0 7.5	+0.9739	0.5422	0.1289	+63	+13
A Sagittarii	4.9	3.37	− 1.9	26 25.9	8 19.2	+ 1 29.8	+1.0519	0.5411	0.1320	+64	+19
36 B. Capricorni	6.2	3.43	+ 2.0	22 40.8	22 31.6	− 8 46.3	−0.9411	0.5299	0.1610	−20	−90
17 Capricorni	5.8	3.49	3.9	21 49.8	8 6 30.1	− 1 3.1	−0.5291	0.5237	0.1755	+ 5	−79
η Capricorni	4.8	+3.51	+ 6.1	−20 11.9	15 28.6	+ 7 38.5	−0.6758	0.5170	+0.1904	− 1	−90
χ Capricorni	5.3	3.58	6.0	21 32.5	17 31.6	+ 9 37.9	+1.1935	0.5155	0.1935	+68	+28
27 Capricorni	6.1	3.57	6.3	20 54.3	18 1.6	+10 6.9	+0.5903	0.5151	0.1943	+65	−13
φ Capricorni	5.3	3.59	6.9	21 0.7	21 5.4	−10 54.9	+1.3108	0.5130	0.1988	+69	+42
128 B. Capricorni	6.5	3.61	8.7	19 31.5	9 4 26.2	− 3 47.5	+1.1772	0.5080	0.2091	+70	+25
γ Capricorni	3.8	+3.59	+10.3	−17 3.2	9 41.9	+ 1 19.0	−0.4300	0.5046	+0.2158	+15	−70
δ Capricorni	3.0	3.61	10.8	16 31.2	13 20.8	+ 4 51.6	−0.2232	0.5024	0.2202	+26	−57
152 B. Capricorni	6.5	3.63	11.1	17 14.9	15 1.8	+ 6 29.6	+0.9538	0.5014	0.2221	+73	+ 8
ι Aquarii	4.4	3.61	13.3	14 17.3	23 44.0	− 9 3.1	−0.3434	0.4966	0.2314	+22	−64
39 Aquarii	6.2	3.64	13.7	14 37.1	10 2 58.7	− 5 53.8	+0.7783	0.4950	0.2345	+75	− 4
42 Aquarii	5.5	+3.62	+14.5	−13 15.7	5 22.5	− 3 34.0	−0.1598	0.4938	+0.2367	+32	−53
45 Aquarii	6.1	3.64	14.5	13 44.2	6 34.6	− 2 23.9	+0.6516	0.4933	0.2377	+75	−11
σ Aquarii	4.9	3.61	16.1	11 7.1	13 0.7	+ 3 51.5	−0.7022	0.4905	0.2431	+ 5	−90
58 Aquarii	6.4	3.62	16.1	11 20.8	13 35.0	+ 4 24.9	−0.3101	0.4903	0.2435	+26	−62
λ Aquarii	3.8	3.61	18.5	8 2.3	11 1 19.2	− 8 9.9	−1.0754	0.4851	0 2515	−16	−90
78 Aquarii	6.3	+3.61	+18.6	− 7 39.7	2 25.7	− 7 5.3	−1.2136	0.4858	+0.2521	−26	−90
81 Aquarii	6.4	3.62	19.1	7 31.4	6 17.8	− 3 19.4	−0.3888	0.4848	0.2542	+23	−67
82 Aquarii	6.4	3.62	19.3	7 2.2	6 57.0	− 2 41.2	−0.7631	0.4846	0.2546	+ 4	−90
h Aquarii	5.4	3.65	19.3	8 9.5	8 25.7	− 1 14.9	+0.8595	0.4843	0.2553	+82	0
φ Aquarii	4.4	3.64	20.0	6 30.8	13 40.0	+ 3 51.0	+0.3756	0.4832	0.2576	+64	−25
96 Aquarii	5.7	+3.64	+20.7	− 5 35.6	16 34.1	+ 6 40.6	+0.1044	0.4827	+0.2588	+49	−39
316 B. Aquarii	6.5	3.63	20.9	4 23.2	17 3.8	+ 7 9.5	−1.1079	0.4826	0.2589	−17	−90
317 B. Aquarii	6.3	3.64	20.5	6 22.7	17 19.0	+ 7 24.3	+1.1688	0.4826	0.2590	+84	+20
337 B. Aquarii	6.4	.3.66	21.2	5 0.0	22 23.5	−11 39.2	+0.9577	0.4819	0.2606	+85	+ 6
342 B. Aquarii	6.5	3.66	21.4	4 33.4	23 32.3	−10 32.2	+0.7638	0.4818	0.2609	+85	− 5
60 B. Piscium	6.0	+3.64	+23.4	− 0 22.1	12 12 57.7	+ 2 32.1	−0.3685	0.4813	+0.2632	+26	−65
98 B. Piscium	6.3	3.67	24.5	+ 1 12.7	13 2 12.4	− 8 34.0	+1.3633	0.4825	0.2628	+90	+39
60 Piscium	6.2	3.69	25.7	6 16.4	19 4.5	+ 7 51.2	+0.1544	0.4864	0.2585	+53	−35
62 Piscium	6.1	3.69	25.7	6 49.9	19 34.4	+ 8 20 4	−0.3356	0.4865	0.2584	+27	−62
δ Piscium	4.6	3.69	25.7	7 7.1	19 47.7	+ 8 33.4	−0.5956	0.4866	0.2583	+14	−79
ε Piscium	4.4	+3.71	+26.0	+ 7 25.8	14 3 48.7	− 7 38.7	+1.1172	0.4893	+0.2546	+90	+18
π Piscium	5.6	3.75	26.1	11 42.2	22 32.6	+10 34.3	+1.0527	0.4977	0.2419	+90	+16
20 H¹. Arietis	6.4	3.83	25.2	16 49.4	15 15 33.8	+ 3 6.2	−0.6010	0.5076	0.2250	+13	−70
26 Arietis	6.2	3.87	24.5	19 28.6	16 2 23.6	−10 23.4	−1.1435	0.5147	0.2113	−23	−71
27 Arietis	6.4	3.85	24.7	17 19.6	2 33.3	−10 14.0	+1.2457	0.5149	0.2111	+90	+37
μ Arietis	5.7	+3.88	+24.0	+19 38.9	8 15.1	− 4 42.6	−0.1167	0.5189	+0.2030	+38	−41
47 Arietis	5.8	3.92	23.3	20 19.6	15 56.3	+ 2 44.1	+0.6557	0.5244	0.1910	+90	0
ε Arietis (*mean*)	4.6	3.91	23.2	21 0.0	16 29.2	+ 3 16.0	+0.0264	0.5248	0.1900	+46	−32
66 Arietis	6.1	3.95	21.3	22 30.6	17 6 20.2	− 7 19.7	+0.8431	0.5350	0.1651	+90	+14
7 Tauri	5.9	3.98	20.8	24 10.7	9 5.6	− 4 39.8	−0.5213	0.5371	0.1597	+16	−57
11 Tauri	6.1	+3.99	+20.2	+25 3.3	11 59.4	− 1 51.8	−1.0165	0.5393	+0.1538	−15	−65
16 Tauri	5.4	3.97	20.1	24 1.3	13 50.8	− 0 4.2	+0.3851	0.5406	0.1500	+68	− 9
17 Tauri	3.8	3.97	20.2	23 50.8	13 52.9	− 0 2.2	+0.5812	0.5406	0.1499	+84	+ 1
18 Tauri	5.6	3.98	20.0	24 34.4	14 0.1	+ 0 4.8	−0.1884	0.5407	0.1496	+34	−38
q Tauri	4.3	3.98	20.1	24 12.0	14 1.6	+ 0 6.3	+0.2186	0.5407	0.1496	+57	−17
20 Tauri	4.1	+3.98	+20.0	+24 6.1	14 18.6	+ 0 22.7	+0.3678	0.5409	+0.1490	+67	−10

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. $\Delta\alpha$	Red'ns from 1913.0. $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		s	″	° ′	d h m	h m				°	°
21 Tauri	5.8	+3.98	+20.0	+24 17.4	17 14 20.7	+ 0 24.7	+0.1701	0.5410	+0.1489	+54	−20
22 Tauri	6.5	3.98	20.0	24 15.8	14 24.5	+ 0 28.5	+0.2084	0.5410	0.1488	+57	−18
23 Tauri	4.3	3.97	20.1	23 41.0	14 32.7	+ 0 36.3	+0.8561	0.5411	0.1485	+90	+17
η Tauri	3.0	3.97	20.0	23 50.5	15 4.1	+ 1 6.6	+0.7614	0.5415	0.1474	+90	+11
27 Tauri	3.7	3.97	19.9	23 47.6	15 49.8	+ 1 50.7	+0.9256	0.5420	0.1457	+90	+21
28 Tauri	5.2	+3.97	+19.9	+23 52.6	15 50.4	+ 1 51.3	+0.8366	0.5420	+0.1457	+90	+16
14 H. Tauri	5.3	4.00	19.5	25 19.4	16 19.7	+ 2 19.7	−0.6587	0.5424	0.1447	+ 8	−63
p Tauri	5.6	4.01	17.9	26 15.6	18 1 29.2	+11 10.1	−0.4373	0.5489	0.1242	+21	−49
φ Tauri	5.0	4.02	17.0	27 8.9	5 39.3	− 8 48.6	−0.8972	0.5516	0.1143	− 8	−63
χ Tauri	5.3	3.98	17.2	25 25.8	6 39.2	− 7 50.7	+1.0677	0.5523	0.1119	+90	+35
17 B. Aurigæ	6.0	+4.00	+14.3	+27 45.4	19 35.3	+ 4 37.4	−0.1982	0.5602	+0.0790	+33	−32
38 B. Aurigæ	6.5	3.97	13.3	27 34.7	19 0 35.2	+ 9 26.3	+0.3536	0.5628	0.0656	+67	− 1
47 B. Aurigæ	6.0	3.97	12.9	27 55.5	2 43.3	+11 29.6	+0.1172	0.5639	0.0598	+51	−13
354 B. Tauri	6.4	3.94	11.9	27 52.4	7 24.3	− 7 59.8	+0.4218	0.5660	0.0468	+72	+ 4
22 Aurigæ	6.4	3.97	11.4	28 51.5	8 22.7	− 7 3.5	−0.5843	0.5664	0.0440	+11	−51
β Tauri	1.8	+3.95	+11.1	+28 32.3	9 35.2	− 5 53.7	−0.1918	0.5670	+0.0406	+33	−28
107 B. Aurigæ	6.5	3.90	10.6	27 36.6	13 34.6	− 2 3.3	+0.9364	0.5684	0.0293	+90	+34
116 B. Aurigæ	5.9	3.94	9.9	29 10.1	14 56.3	− 0 44.8	−0.6857	0.5689	0.0254	+ 5	−58
406 B. Tauri	5.6	3.86	9.2	27 56.7	19 44.0	+ 3 52.0	+0.7025	0.5703	0.0115	+90	+21
136 Tauri	4.6	3.84	9.1	27 35.7	20 42.2	+ 4 48.0	+1.0836	0.5706	0.0086	+90	+45
154 B. Aurigæ	6.4	+3.88	+ 8.4	+28 55.9	21 59.9	+ 6 2.7	−0.3254	0.5709	+0.0048	+26	−32
415 B. Tauri	6.1	3.82	8.4	27 34.3	23 50.0	+ 7 48.6	+1.1202	0.5713	−0.0005	+90	+48
183 B. Aurigæ	6.3	3.86	7.3	29 31.3	20 1 58.7	+ 9 52.3	−0.9537	0.5718	0.0068	−13	−60
κ Aurigæ	4.4	3.82	6.3	29 32.0	5 38.2	−10 36.6	−1.0080	0.5724	0.0176	−18	−60
211 B. Aurigæ	6.3	3.81	5.9	29 35.0	7 59.3	− 8 20.9	−1.1094	0.5726	0.0246	−27	−60
49 Aurigæ	5.1	+3.71	+ 5.1	+28 5.5	13 40.8	− 2 52.6	+0.2747	0.5730	−0.0414	+61	− 4
53 Aurigæ	5.6	3.72	4.5	29 3.7	14 57.1	− 1 39.1	−0.7994	0.5731	0.0452	− 2	−61
54 Aurigæ	5.8	3.69	4.7	28 20.5	15 26.1	− 1 11.3	−0.0654	0.5731	0.0466	+41	−21
28 Geminorum	5.5	3.69	3.9	29 3.7	17 31.7	+ 0 49.5	−0.9245	0.5731	0.0528	−11	−61
47 Geminorum	5.6	3.50	2.2	27 0.1	21 4 20.4	+11 13.2	+0.4925	0.5721	0.0844	+78	+ 4
53 Geminorum	5.9	+3.52	+ 1.4	+28 3.0	6 10.6	−11 0.9	−0.7629	0.5718	−0.0896	0	−62
134 B. Geminorum	6.5	3.49	1.6	26 50.8	6 38.5	−10 34.0	+0.4503	0.5718	0.0910	+74	+ 1
59 Geminorum	5.7	3.47	0.8	27 48.4	9 40.7	− 7 38.8	−0.8396	0.5712	0.0996	− 4	−62
ι Geminorum	3.9	3.45	+ 0.5	27 58.3	10 9.4	− 7 11.2	−1.0592	0.5711	0.1010	−21	−62
υ Geminorum	4.3	3.38	− 0.1	27 5.4	14 19.5	− 3 10.6	−0.5848	0.5701	0.1127	+12	−56
c Geminorum	5.5	+3.31	− 0.4	+25 59.5	17 41.6	+ 0 3.7	+0.1610	0.5692	−0.1220	+54	−17
ω Cancri	5.9	3.20	1.7	25 37.9	22 0 37.1	+ 6 43.6	−0.3746	0.5670	0.1406	+24	−47
4 Cancri	6.2	3.19	1.7	25 19.8	0 57.2	+ 7 3.0	−0.1097	0.5668	0.1415	+38	−32
ψ Cancri	5.9	3.15	2.9	25 46.3	4 33.8	+10 31.4	−1.0929	0.5656	0.1509	−22	−64
35 B. Cancri	6.4	3.07	2.1	23 24.0	5 56.6	+11 51.1	+1.1432	0.5650	0.1544	+90	+37
λ Cancri	5.9	+3.06	− 3.0	+24 17.8	8 46.8	− 9 25.1	−0.2295	0.5640	−0.1615	+32	−40
28 Cancri	6.1	3.01	3.7	24 26.0	12 9.6	− 6 9.8	−0.9295	0.5626	0.1698	− 9	−66
$υ^1$ Cancri	5.7	2.99	3.9	24 22.4	13 22.8	− 4 59.3	−1.0770	0.5622	0.1728	−20	−66
$υ^2$ Cancri	6.4	2.98	4.0	24 22.8	14 0.4	− 4 23.1	−1.1918	0.5619	0.1743	−31	−66
γ Cancri	4.7	2.86	3.9	21 46.9	18 23.1	− 0 10.1	+0.6892	0.5600	0.1846	+90	+ 4
8 Leonis	5.9	+2.45	− 6.3	+16 49.6	23 17 37.3	− 1 46.1	+0.8572	0.5501	−0.2323	+90	+ 9
34 Leonis	6.4	2.21	7.6	13 47.0	24 9 0.5	−10 55.0	+0.1522	0.5445	0.2569	+53	−32
37 Leonis	5.5	2.18	8.1	14 9.6	11 16.4	− 8 43.7	−0.8120	0.5438	0.2600	+ 2	−76
c Leonis	5.1	1.85	8.4	6 34.0	25 7 20.1	+10 38.9	+1.3245	0.5392	0.2819	+90	+37
χ Leonis	4.7	1.83	9.0	7 48.3	9 17.9	−11 27.3	−0.4629	0.5389	0.2834	+21	−69
σ Leonis	4.1	+1.75	− 9.5	+ 6 30.2	16 41.5	− 4 18.6	−1.2826	0.5384	−0.2884	−30	−83
80 Leonis	6.4	1.71	9.2	4 20.2	18 51.3	− 2 13.1	+0.2432	0.5383	0.2896	+58	−32
83 Leonis	6.3	1.67	8.9	3 29.1	19 18.5	− 1 46.8	+0.9568	0.5383	0.2898	+90	+ 6
τ Leonis	5.2	1.70	9.1	3 20.0	19 49.2	− 1 17.1	+0.9592	0.5383	0.2901	+90	+ 7
89 Leonis	5.7	1.67	9.5	3 32.5	22 47.0	+ 1 34 7	−0.1088	0.5383	0.2914	+39	−50
9 B. Virginis	6.2	+1.57	− 9.4	+ 0 9.7	26 5 31.3	+ 8 5.5	+1.2650	0.5387	−0.2934	+90	+28

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
β Virginis	3.8	+1.64	−10.1	+ 2 15.1	**26** 6 14.8	+ 8 47.5	−1.0158	0.5387	−0.2936	−10	−88
27 B. Virginis	6.5	1.56	10.0	+ 1 0.7	10 7.1	−11 27.9	−0.9262	0.5392	0.2941	− 4	−89
31 B. Virginis	6.4	1.53	9.7	− 1 17.1	11 1.3	−10 35.6	+1.0784	0.5393	0.2941	+89	+14
				NEW	*MOON.*						
85 B. Scorpii	6.0	+1.64	−13.4	−25 15.6	**30** 22 15.1	− 3 17.2	−0.7650	0.5859	−0.1271	−15	−90
σ Scorpii	3.1	1.67	13.3	25 23.3	**31** 0 41.3	− 0 56.9	−0.9375	0.5864	0.1199	−26	−90
α Scorpii	1.2	1.71	13.3	26 14.6	3 51.3	+ 2 5.4	−0.4349	0.5871	0.1103	+ 2	−73
116 B. Scorpii	6.2	1.72	13.3	26 21.2	4 37.0	+ 2 49.3	−0.4071	0.5872	0.1080	+ 3	−70
τ Scorpii	2.9	1.76	13.5	28 2.4	6 19.6	+ 4 27.7	+1.1304	0.5875	0.1027	+62	+28
134 B. Scorpii	6.4	+1.80	−13.2	−27 17.8	9 34.8	+ 7 35.1	+0.0566	0.5879	−0.0927	+25	−41
135 B. Scorpii	6.0	1.81	13.4	28 21.1	9 50.3	+ 7 49.9	+1.1091	0.5878	0.0919	+62	+26
95 G. Ophiuchi	6.1	+1.95	−12.5	−27 39.5	20 24.4	− 6 1.6	−0.3937	0.5876	−0.0586	− 1	−70

NOVEMBER.

Name.	Mag.	Δα	Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
43 Ophiuchi	5.4	+2.02	−12.2	−28 3.8	**1** 0 37.3	− 1 59.0	−0.1973	0.5869	−0.0452	+ 8	−56
163 G. Ophiuchi	6.3	2.13	11.4	27 50.8	8 20.9	+ 5 25.9	−0.6778	0.5849	0.0207	−19	−90
X Sagittarii (*var.*)	4.4	2.16	11.2	27 48.1	10 0.5	+ 7 1.5	−0.7549	0.5843	0.0155	−24	−90
10 G. Sagittarii	5.7	2.22	10.8	28 3.3	13 34.2	+10 26.7	−0.5289	0.5830	0.0043	−13	−81
210 B. Scorpii	5.8	+2.24	−10.9	−28 45.2	14 19.5	+11 10.2	+0.1943	0.5827	−0.0020	+24	−33
W Sagittarii (*var.*)	4.3	2.29	10.9	29 35.3	16 48.5	−10 26.7	+1.0683	0.5817	+0.0057	+60	+23
38 B. Sagittarii	4.7	2.29	10.4	28 28.2	18 1.9	− 9 16.2	−0.0859	0.5811	0.0095	+10	−49
C. D. −28° 14268	6.4	2.32	10.4	28 55.4	19 33.4	− 7 48.4	+0.4050	0.5804	0.0141	+38	−21
48 G. Sagittarii	6.3	2.35	10.1	28 19.2	21 42.6	− 5 44.2	−0.1876	0.5792	0.0207	+ 6	−56
62 B. Sagittarii	6.0	+2.36	− 9.9	−28 41.1	21 42.8	− 5 44.0	+0.1935	0.5792	+0.0207	+26	−33
58 G. Sagittarii	6.1	2.38	9.7	28 28.4	23 32.5	− 3 58.6	+0.0152	0.5781	0.0262	+17	−44
φ Sagittarii	3.3	2.50	7.9	27 5.0	**2** 9 4.0	+ 5 10.7	−1.0619	0.5722	0.0542	−40	−90
τ Sagittarii	3.5	2.63	7.0	27 48.0	17 47.7	−10 25.5	+0.2729	0.5658	0.0785	+35	−29
234 B. Sagittarii	5.9	2.75	5.7	28 2.2	**3** 1 9.3	− 3 20.2	+1.1759	0.5599	0.0978	+62	+33
248 B. Sagittarii	5.7	+2.76	− 5.0	−27 9.9	3 27.2	− 1 7.3	+0.4822	0.5579	+0.1036	+50	−17
ω Sagittarii	4.8	2.91	2.9	26 31.9	14 44.2	+ 9 45.4	+1.1343	0.5480	0.1305	+63	+27
A Sagittarii	4.9	2.92	− 2.6	26 25.9	16 7.5	+11 5.8	+1.2121	0.5468	0.1336	+64	+35
36 B. Capricorni	6.2	3.00	+ 1.0	22 40.8	**4** 6 4.7	+ 0 34.5	−0.7560	0.5343	0.1624	− 9	−90
17 Capricorni	5.8	3.07	2.6	21 49.8	13 56.0	+ 8 10.4	−0.3461	0.5273	0.1767	+15	−65
η Capricorni	4.8	+3.12	+ 4.7	−20 11.9	22 47.4	− 7 15.1	−0.4907	0.5199	+0.1912	+ 9	−75
27 Capricorni	6.1	3.17	4.7	20 54.3	**5** 1 18.6	− 4 48.5	+0.7661	0.5178	0.1951	+69	− 3
30 Capricorni	5.4	3.15	6.4	18 20.9	5 32.2	− 0 42.7	−1.1862	0.5144	0.2013	−33	−90
128 B. Capricorni	6.5	3.23	7.0	19 31.6	11 36.9	+ 5 10.9	+1.3499	0.5098	0.2094	+70	+48
γ Capricorni	3.8	3.23	8.6	17 3.2	16 50.0	+10 14.8	−0.2479	0.5060	0.2160	+25	−58
δ Capricorni	3.0	+3.26	+ 9.2	−16 31.2	20 27.4	−10 14.2	−0.0432	0.5035	+0.2202	+35	−47
152 B. Capricorni	6.5	3.28	9.4	17 14.9	22 7.6	− 8 37.0	+1.1271	0.5024	0.2220	+73	+20
ι Aquarii	4.4	3.29	11.7	14 17.3	**6** 6 46.9	− 0 12.6	−0.1661	0.4971	0.2310	+31	−54
39 Aquarii	6.2	3.32	12.0	14 37.2	10 0.7	+ 2 55.7	+0.9491	0.4953	0.2340	+75	+ 7
42 Aquarii	5.5	3.31	12.9	13 15.7	12 23.9	+ 5 14.9	+0.0140	0.4939	0.2360	+41	−44
45 Aquarii	6.1	+3.34	+12.8	−13 44.2	13 35.7	+ 6 24.7	+0.8215	0.4933	+0.2370	+76	− 1
σ Aquarii	4.9	3.33	14.6	11 7.2	20 0.6	−11 21.0	−0.5306	0.4903	0.2422	+15	−77
58 Aquarii	6.4	3.34	14.6	11 20.9	20 34.8	−10 47.7	−0.1402	0.4900	0.2426	+34	−52
λ Aquarii	3.8	3.37	17.1	8 2.3	**7** 8 17.8	+ 0 36.3	−0.9119	0.4855	0.2501	− 5	−90
78 Aquarii	6.3	3.37	17.3	7 39.8	9 24.2	+ 1 40.8	−1.0506	0.4851	0.2508	−14	−90
81 Aquarii	6.4	+3.40	+17.8	− 7 31.4	13 16.1	+ 5 26.6	−0.2316	0.4840	+0.2528	+31	−57
82 Aquarii	6.4	3.40	18.0	7 2.2	13 55.3	+ 6 4.7	−0.6054	0.4839	0.2531	+12	−83
h Aquarii	5.4	3.43	17.9	8 9.5	15 23.9	+ 7 30.9	+1.0115	0.4834	0.2538	+82	+10
φ Aquarii	4.4	3.44	18.8	6 30.8	20 38.1	−11 23.2	+0.5240	0.4822	0.2561	+74	−18
96 Aquarii	5.7	3.46	19.5	5 35.7	23 32.2	− 8 33.6	+0.2505	0.4817	0.2571	+57	−32
316 B. Aquarii	6.5	+3.45	+19.8	− 4 23.3	**8** 0 1.9	− 8 4.8	−0.9597	0.4816	+0.2572	− 7	−90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. Δα	Red'ns from 1913.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x′	y′	N.	S.
		s	″	° ′	d h m	h m				°	°
317 B. Aquarii	6.3	+3.45	+19.3	− 6 22.7	8 0 17.2	− 7 50.0	+1.3117	0.4816	+0.2573	+84	+33
337 B. Aquarii	6.4	3.49	20.1	5 0.1	5 21.0	− 2 54.1	+1.0932	0.4809	0.2589	+85	+15
342 B. Aquarii	6.5	3.49	20.3	4 33.4	6 30.5	− 1 46.4	+0.9008	0.4807	0.2592	+85	+ 3
60 B. Piscium	6.0	3.53	22.7	− 0 22.1	19 56.0	+11 18.0	−0.2461	0.4804	0.2613	+32	−58
60 Piscium	6.2	3.70	25.9	+ 6 16.4	10 2 1.1	− 7 24.6	+0.2300	0.4864	0.2569	+57	−32
62 Piscium	6.1	+3.70	+26.0	+ 6 49.9	2 31.0	− 6 55.4	−0.2598	0.4865	+0.2567	+31	−57
δ Piscium	4.6	3.70	26.0	7 7.1	2 44.3	− 6 42.5	−0.5196	0.4866	0.2566	+18	−73
ε Piscium	4.4	3.75	26.3	7 25.8	10 43.9	+ 1 4.2	+1.1756	0.4898	0.2531	+90	+23
π Piscium	5.6	3.89	27.0	11 42.3	11 5 22.6	− 4 48.1	+1.0773	0.4992	0.2408	+90	+18
20 H^1. Arietis	6.4	4.06	26.8	16 49.4	22 16.4	+11 36.3	−0.6020	0.5101	0.2242	+13	−70
26 Arietis	6.2	+4.17	+26.4	+19 28.6	12 9 0.2	− 1 59.2	−1.1617	0.5179	+0.2108	−24	−71
27 Arietis	6.4	4.14	26.2	17 19.6	9 9.8	− 1 49.9	+1.2176	0.5180	0.2105	+90	+35
μ Arietis	5.7	4.21	25.9	19 38.9	14 48.1	+ 3 37.9	−0.1495	0.5223	0.2025	+36	−42
47 Arietis	5.8	4.28	25.1	20 19.6	22 24.1	+10 59.5	+0.6060	0.5283	0.1905	+85	− 2
ε Arietis (*mean*)	4.6	4.29	25.1	21 0.0	22 56.7	+11 31.1	−0.0214	0.5286	0.1896	+43	−34
66 Arietis	6.1	+4.40	+23.2	+22 30.7	13 12 37.7	+ 0 45.2	+0.7679	0.5395	+0.1647	+90	+10
7 Tauri	5.9	4.46	22.8	24 10.8	15 21.0	+ 3 22.9	−0.5947	0.5418	0.1593	+12	−61
11 Tauri	6.1	4.50	22.3	25 3.3	18 12.6	+ 6 8.8	−1.0923	0.5441	0.1534	−22	−65
16 Tauri	5.4	4.48	22.0	24 1.4	20 2.5	+ 7 54.9	+0.2997	0.5454	0.1495	+62	−13
17 Tauri	3.8	4.48	22.0	23 50.8	20 4.6	+ 7 56.9	+0.4948	0.5454	0.1495	+77	− 3
18 Tauri	5.6	+4.50	+22.0	+24 34.4	20 11.7	+ 8 3.8	−0.2714	0.5455	+0.1492	+29	−42
q Tauri	4.3	4.49	22.0	24 12.1	20 13.2	+ 8 5.2	+0.1337	0.5455	0.1491	+52	−21
20 Tauri	4.1	4.49	22.0	24 6.2	20 30.0	+ 8 21.5	+0.2816	0.5458	0.1485	+61	−14
21 Tauri	5.8	4.49	22.0	24 17.4	20 32.0	+ 8 23.4	+0.0848	0.5458	0.1485	+49	−24
22 Tauri	6.5	4.49	22.0	24 15.8	20 35.8	+ 8 27.1	+0.1227	0.5459	0.1483	+51	−22
23 Tauri	4.3	+4.48	+21.9	+23 41.0	20 43.9	+ 8 34.9	+0.7673	0.5460	+0.1480	+90	+12
η Tauri	3.0	4.48	21.8	23 50.6	21 14.9	+ 9 4.8	+0.6721	0.5463	0.1469	+90	+ 6
27 Tauri	3.7	4.49	21.7	23 47.6	22 0.0	+ 9 48.3	+0.8343	0.5469	0.1453	+90	+16
28 Tauri	5.2	4.49	21.7	23 52.7	22 0.6	+ 9 48.9	+0.7457	0.5469	0.1453	+90	+11
14 H. Tauri	5.3	4.53	21.5	25 19.4	22 29.5	+10 16.8	−0.7434	0.5472	0.1442	+ 2	−65
p Tauri	5.6	+4.60	+19.8	+26 15.6	14 7 31.9	− 4 59.7	−0.5374	0.5539	+0.1236	+14	−55
φ Tauri	5.0	4.64	18.8	27 8.9	11 38.8	− 1 1.6	−1.0016	0.5568	0.1137	−16	−63
χ Tauri	5.3	4.60	18.8	25 25.8	12 38.0	− 0 4.5	+0.9529	0.5575	0.1113	+90	+27
17 B. Aurigæ	6.0	4.71	15.7	27 45.4	15 1 24.5	−11 46.0	−0.3265	0.5652	0.0781	+26	−39
38 B. Aurigæ	6.5	4.70	14.5	27 34.8	6 20.9	− 7 0.7	+0.2163	0.5677	0.0647	+58	− 9
47 B. Aurigæ	6.0	+4.72	+14.0	+27 55.5	8 27.6	− 4 58.7	−0.0223	0.5687	+0.0588	+43	−20
354 B. Tauri	6.4	4.71	12.8	27 52.4	13 5.7	− 0 31.0	+0.2750	0.5707	0.0457	+61	− 4
22 Aurigæ	6.4	4.75	12.4	28 51.5	14 3.5	+ 0 24.6	−0.7293	0.5711	0.0430	+ 2	−61
β Tauri	1.8	4.74	12.0	28 32.3	15 15.3	+ 1 33.6	−0.3396	0.5715	0.0395	+25	−36
107 B. Aurigæ	6.5	4.69	11.2	27 36.6	19 12.5	+ 5 21.9	+0.7800	0.5728	0.0281	+90	+24
116 B. Aurigæ	5.9	+4.75	+10.6	+29 10.1	20 33.3	+ 6 39.5	−0.8394	0.5732	+0.0242	− 5	−61
406 B. Tauri	5.6	4.69	9.5	27 56.7	16 1 18.6	+11 13.9	+0.5393	0.5744	0.0102	+82	+13
136 Tauri	4.6	4.68	9.3	27 35.7	2 16.4	−11 50.4	+0.9183	0.5745	0.0073	+90	+34
154 B. Aurigæ	6.4	4.72	8.7	28 55.9	3 33.5	−10 36.3	−0.4895	0.5749	+0.0035	+16	−42
415 B. Tauri	6.1	4.66	8.4	27 34.3	5 22.8	− 8 51.2	+0.9513	0.5751	−0.0019	+90	+37
183 B. Aurigæ	6.3	+4.73	+ 7.4	+29 31.3	7 30.7	− 6 48.3	−1.1217	0.5754	−0.0082	−29	−60
κ Aurigæ	4.4	4.71	6.2	29 32.0	11 8.8	− 3 18.6	−1.1808	0.5757	0.0190	−36	−60
49 Aurigæ	5.1	4.61	4.4	28 5.5	19 9.3	+ 4 23.3	+0.0911	0.5757	0.0428	+50	−13
53 Aurigæ	5.6	4.64	3.8	29 3.7	20 25.3	+ 5 36.5	−0.9843	0.5756	0.0466	−16	−61
54 Aurigæ	5.8	4.60	3.9	28 20.5	20 54.3	+ 6 4.3	−0.2509	0.5756	0.0480	+30	−31
28 Geminorum	5.5	+4.62	+ 3.1	+29 3.6	22 59.5	+ 8 4.6	−1.1126	0.5754	−0.0541	−27	−61
47 Geminorum	5.6	4.44	+ 0.5	27 0.0	17 9 48.0	− 5 31.9	+0.2938	0.5733	0.0855	+63	− 6
53 Geminorum	5.9	4.47	− 0.2	28 3.0	11 38.4	− 3 45.7	−0.9661	0.5728	0.0908	−14	−62
134 B. Geminorum	6.5	4.42	0.1	26 50.8	12 6.3	− 3 18.8	+0.2493	0.5727	0.0921	+59	−10
59 Geminorum	5.7	4.42	1.1	27 48.4	15 9.0	− 0 23.1	−1.0468	0.5718	0.1006	−20	−62
ι Geminorum	3.9	+4.42	− 1.3	+27 58.3	15 37.8	+ 0 4.6	−1.2675	0.5716	−0.1020	−48	−62

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
υ Geminorum	4.3	+4.34	− 2.3	+27 5.4	17 19 48.9	+ 4 6.2	−0.7963	0.5702	−0.1135	− 2	−63
c Geminorum	5.5	4.26	2.8	25 59.5	23 12.2	+ 7 21.7	−0.0512	0.5689	0.1227	+41	−28
ω Cancri	5.9	4.17	4.6	25 37.8	18 6 10.7	− 9 55.5	−0.5953	0.5657	0.1410	+11	−59
5 B. Cancri	6.4	4.11	4.0	23 49.3	6 14.4	− 9 52.0	+1.2754	0.5657	0.1411	+90	+53
4 Cancri	6.2	4.15	4.5	25 19.7	6 31.0	− 9 36.0	−0.3294	0.5656	0.1418	+26	−44
35 B. Cancri	6.4	+4.02	− 5.2	+23 23.9	11 33.3	− 4 44.9	+0.9268	0.5631	−0.1544	+90	+21
λ Cancri	5.9	4.02	6.2	24 17.7	14 25.5	− 1 59.0	−0.4560	0.5616	0.1614	+19	−53
28 Cancri	6.1	3.98	7.2	24 25.9	17 50.8	+ 1 18.7	−1.1632	0.5600	0.1695	−28	−66
υ^1 Cancri	5.7	3.95	7.5	24 22.4	19 5.0	+ 2 30.2	−1.3127	0.5593	0.1724	−50	−66
γ Cancri	4.7	3.80	7.8	21 46.8	19 0 9.7	+ 7 23.9	+0.4631	0.5565	0.1838	+73	− 8
8 Leonis	5.9	+3.35	−11.0	+16 49.5	23 51.8	+ 6 15.9	+0.6279	0.5441	−0.2296	+86	− 5
34 Leonis	6.4	3.07	12.7	13 46.9	20 15 39.5	− 2 28.5	−0.0833	0.5369	0.2529	+40	−44
37 Leonis	5.5	3.04	13.2	14 9.5	17 59.3	− 0 13.4	−1.0599	0.5360	0.2558	−14	−76
c Leonis	5.1	2.64	13.5	6 33.9	21 14 41.1	− 4 12.4	+1.1218	0.5303	0.2762	+90	+19
χ Leonis	4.7	2.62	14.2	7 48.2	16 42.8	− 2 14.7	−0.6914	0.5299	0.2776	+ 9	−82
80 Leonis	6.4	+2.47	−14.2	+ 4 20.1	22 2 35.7	+ 7 19.0	+0.0369	0.5289	−0.2833	+46	−42
83 Leonis	6.3	2.42	13.8	3 29.0	3 3.8	+ 7 46.2	+0.7627	0.5289	0.2835	+90	− 5
τ Leonis	5.2	2.45	14.0	3 19.9	3 35.6	+ 8 17.0	+0.7658	0.5289	0.2837	+90	− 5
89 Leonis	5.7	2.41	14.4	3 32.4	6 39.5	+11 14.9	−0.3154	0.5289	0.2849	+28	−61
9 B. Virginis	6.2	2.30	14.0	0 9.7	13 37.8	− 6 0.3	+1.0910	0.5293	0.2868	+90	+15
β Virginis	3.8	+2.37	−15.0	+ 2 15.1	14 22.8	− 5 16.7	−1.2258	0.5293	−0.2869	−25	−88
27 B. Virginis	6.5	2.27	14.6	+ 1 0.6	18 23.1	− 1 24.2	−1.1283	0.5298	0.2874	−18	−89
31 B. Virginis	6.4	2.24	14.1	− 1 17.2	19 19.1	− 0 30.0	+0.9105	0.5300	0.2874	+89	+ 4
162 B. Virginis	6.2	2.09	14.2	4 8.3	23 7 58.2	+11 44.4	+0.1406	0.5329	0.2858	+51	−37
200 B. Virginis	6.3	2.07	14.2	4 34.6	9 44.4	−10 32.9	+0.0748	0.5334	0.2853	+48	−40
f Virginis	6.0	+2.05	−14.2	− 5 21.4	12 8.5	− 8 13.5	+0.1722	0.5342	−0.2844	+53	−35
319 B. Virginis	6.3	2.00	14.5	5 49.8	17 8.7	− 3 23.3	−0.7713	0.5361	0.2821	+ 4	−90
49 Virginis	5.2	1.91	13.9	10 16.8	24 2 29.0	+ 5 38.2	+1.0754	0.5403	0.2758	+80	+15
g Virginis	5.6	1.92	14.4	8 31.4	2 47.3	+ 5 56.0	−0.7666	0.5404	0.2756	+ 3	−90
50 Virginis	6.2	1.91	14.0	9 52.2	3 20.1	+ 6 27.6	+0.4307	0.5407	0.2752	+66	−22
α Virginis	1.2	+1.86	−14.2	−10 42.7	10 19.2	−10 47.5	−0.6279	0.5444	−0.2688	+ 9	−85
i Virginis	5.7	1.84	13.9	12 15.5	11 0.1	−10 8.1	+0.7375	0.5448	0.2680	+78	− 6
550 B. Virginis	6.0	1.83	14.0	12 46.3	14 33.2	− 6 42.3	+0.3055	0.5468	0.2642	+57	−28
621 B. Virginis	6.4	1.76	14.1	14 33.5	25 3 37.5	+ 5 54.4	−1.2527	0.5550	0.2467	−35	−90
214 G. Virginis	6.5	1.76	13.8	15 55.4	3 57.0	+ 6 13.2	+0.0343	0.5552	0.2462	+40	−42
40 H. Virginis	5.1	+1.76	−13.9	−15 53.7	6 22.2	+ 8 33.2	−0.5853	0.5569	−0.2424	+ 8	−82
43 H. Virginis	5.5	1.74	13.7	17 47.9	8 18.8	+10 25.7	+0.8534	0.5583	−0.2392	+72	+ 2
				NEW	*MOON.*						
58 G. Sagittarii	6.1	+2.24	− 8.5	−28 28.4	29 9 30.1	+ 7 47.1	+0.1842	0.5845	+0.0283	+26	−34
φ Sagittarii	3.3	+2.32	− 7.1	−27 5.0	18 52.2	− 7 13.1	−0.8675	0.5790	+0.0565	−27	−90
τ Sagittarii	3.5	2.41	6.2	27 48.0	30 3 26.6	+ 1 1.5	+0.4733	0.5727	0.0810	+47	−17
201 B. Sagittarii	5.9	2.41	5.3	26 3.3	6 2.5	+ 3 31.4	−1.1414	0.5707	0.0881	−44	−90
248 B. Sagittarii	5.7	2.50	4.5	27 9.9	12 55.4	+10 8.8	+0.6974	0.5649	0.1063	+62	− 5
h Sagittarii	4.7	2.50	3.6	25 4.6	15 49.8	−11 3.3	−1.1892	0.5623	0.1137	−46	−90
308 B. Sagittarii	6.3	+2.54	− 2.6	−24 9.5	23 22.5	− 3 47.0	−1.2406	0.5555	+0.1319	−49	−90

DECEMBER.

36 B. Capricorni	6.2	+2.68	+ 0.6	−22 40.8	1 15 2.8	+11 20.6	−0.4894	0.5406	+0.1652	+ 5	−76
17 Capricorni	5.8	+2.74	+ 2.0	−21 49.8	22 45.6	− 5 12.1	−0.0728	0.5332	+0.1795	+28	−48
η Capricorni	4.8	2.78	3.8	20 11.9	2 7 27.9	+ 3 13.3	−0.2059	0.5252	0.1939	+23	−56
27 Capricorni	6.1	2.83	3.9	20 54.3	9 56.7	+ 5 37.4	+1.0438	0.5230	0.1977	+69	+16
30 Capricorni	5.4	2.81	5.4	18 20.9	14 6.3	+ 9 39.2	−0.8890	0.5193	0.2037	−12	−90
γ Capricorni	3.8	2.90	7.4	17 3.2	3 1 14.2	− 3 33.2	+0.0518	0.5101	0.2180	+40	−41
δ Capricorni	3.0	+2.92	+ 7.8	−16 31.2	4 48.7	− 0 5.1	+0.2578	0.5074	+0.2221	+51	−31

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		s	″	° ′	d h m	h m				°	°
ι Aquarii	4.4	+2.96	+10.2	−14 17.4	8 15 0.8	+ 9 49.2	+0.1415	0.5001	+0.2324	+47	−37
39 Aquarii	6.2	2.99	10.5	14 37.2	18 12.6	−11 4.5	+1.2516	0.4981	0.2353	+75	+30
42 Aquarii	5.5	2.98	11.3	13 15.8	20 34.4	− 8 46.7	+0.3228	0.4966	0.2373	+57	−27
45 Aquarii	6.1	3.01	11.2	13 44.3	21 45.5	− 7 37.6	+1.1261	0.4959	0.2382	+76	+19
σ Aquarii	4.9	3.01	12.9	11 7.2	4 4 7.0	− 1 26.8	−0.2173	0.4923	0.2430	+30	−56
58 Aquarii	6.4	+3.02	+12.9	−11 20.9	4 41.0	− 0 53.7	+0.1712	0.4920	+0.2434	+50	−35
213 B. Aquarii	6.5	3.03	14.6	8 45.8	10 58.8	+ 5 13.6	−1.1276	0.4889	0.2474	−20	−90
λ Aquarii	3.8	3.07	15.4	8 2.3	16 19.1	+10 25.3	−0.5977	0.4867	0.2504	+12	−82
78 Aquarii	6.3	3.07	15.6	7 39.8	17 25.1	+11 29.5	−0.7362	0.4862	0.2509	+ 5	−90
81 Aquarii	6.4	3.10	16.2	7 31.4	21 15.8	− 8 46.0	+0.0786	0.4848	0.2527	+47	−40
82 Aquarii	6.4	+3.10	+16.4	− 7 2.2	21 54.9	− 8 8.0	−0.2942	0.4846	+0.2530	+28	−60
h Aquarii	5.4	3.14	16.1	8 9.5	23 23.1	− 6 42.2	+1.3167	0.4841	0.2536	+82	+35
φ Aquarii	4.4	3.15	17.0	6 30.8	5 4 36.1	− 1 37.4	+0.8288	0.4826	0.2556	+83	− 1
96 Aquarii	5.7	3.18	17.8	5 35.7	7 29.6	+ 1 11.5	+0.5546	0.4819	0.2565	+76	−16
316 B. Aquarii	6.5	3.17	18.2	4 23.3	7 59.2	+ 1 40.3	−0.6524	0.4818	0.2566	+10	−86
337 B. Aquarii	6.4	+3.22	+18.3	− 5 0.1	13 18.2	+ 6 50.9	+1.3943	0.4808	+0.2580	+85	+44
342 B. Aquarii	6.5	3.22	18.6	4 33.5	14 26.9	+ 7 57.8	+1.1989	0.4806	0.2582	+85	+23
60 B. Piscium	6.0	3.28	21.2	− 0 22.1	6 3 51.8	− 2 58.5	+0.0421	0.4796	0.2598	+46	−42
60 Piscium	6.2	3.54	24.9	+ 6 16.4	7 9 59.6	+ 2 21.6	+0.4741	0.4848	0.2545	+72	−19
62 Piscium	6.1	3.55	25.1	6 49.9	10 29.5	+ 2 50.8	−0.0161	0.4850	0.2543	+43	−44
δ Piscium	4.6	+3.55	+25.2	+ 7 7.1	10 42.8	+ 3 3.8	−0.2763	0.4851	+0.2542	+30	−58
ε Piscium	4.4	3.62	25.5	7 25.7	18 43.4	+10 51.4	+1.4031	0.4882	0.2506	+90	+50
π Piscium	5.6	3.83	26.7	11 42.3	8 13 23.9	+ 5 1.0	+1.2653	0.4979	0.2382	+90	+34
20 H^1. Arietis	6.4	4.07	27.2	16 49.5	9 6 17.7	− 2 34.7	−0.4513	0 5095	0.2218	+20	−62
26 Arietis	6.2	4.23	27.2	19 28.6	17 0.4	+ 7 48.7	−1.0358	0.5179	0.2084	−14	−71
27 Arietis	6.4	+4.20	+26.6	+17 19.6	17 10.0	+ 7 58.0	+1.3379	0.5180	+0.2082	+90	+50
μ Arietis	5.7	4.30	26.7	19 38.9	22 47.1	−10 35.4	−0.0401	0.5226	0.2003	+42	−36
47 Arietis	5.8	4.42	26.0	20 19.7	10 6 21.2	− 3 15.7	+0.6940	0.5291	0.1884	+90	+ 3
ε Arietis (*mean*)	4.6	4.42	26.0	21 0.0	6 53.5	− 2 44.4	+0.0672	0.5296	0.1875	+48	−29
66 Arietis	6.1	4.62	24.2	22 30.7	20 29.1	+10 24.4	+0.8187	0.5414	0.1628	+90	+13
7 Tauri	5.9	+4.70	+24.2	+24 10.8	23 11.0	−10 59.3	−0.5450	0.5439	+0.1574	+14	−58
11 Tauri	6.1	4.75	23.8	25 3.3	11 2 1.1	− 8 15.1	−1.0473	0.5463	0.1516	−18	−65
16 Tauri	5.4	4.75	23.3	24 1.4	3 50.0	− 6 29.9	+0.3336	0.5479	0.1477	+65	−11
17 Tauri	3.8	4.74	23.2	23 50.8	3 52.1	− 6 27.9	+0.5277	0.5479	0.1476	+79	− 1
18 Tauri	5.6	4.76	23.3	24 34.4	3 59.1	− 6 21.0	−0.2352	0.5480	0.1474	+31	−40
q Tauri	4.3	+4.76	+23.3	+24 12.1	4 0.6	− 6 19.6	+0.1679	0.5480	+0.1473	+54	−20
20 Tauri	4.1	4.76	23.2	24 6.2	4 17.3	− 6 3.5	+0.3145	0.5482	0.1467	+63	−12
21 Tauri	5.8	4.76	23.2	24 17.4	4 19.3	− 6 1.6	+0.1186	0.5483	0.1467	+51	−22
22 Tauri	6.5	4.76	23.2	24 15.8	4 23.0	− 5 58.0	+0.1562	0.5483	0.1465	+53	−20
23 Tauri	4.3	4.75	23.1	23 41.1	4 31.0	− 5 50.3	+0.7972	0.5484	0.1463	+90	+14
η Tauri	3.0	+4.75	+23.0	+23 50.6	5 1.7	− 5 20.7	+0.7012	0.5489	+0.1451	+90	+ 8
27 Tauri	3.7	4.76	22.9	23 47.7	5 46.4	− 4 37.6	+0.8607	0.5495	0.1435	+90	+18
28 Tauri	5.2	4.76	22.9	23 52.7	5 46.9	− 4 37.1	+0.7725	0.5495	0.1435	+90	+13
14 H. Tauri	5.3	4.81	23.0	25 19.4	6 15.6	− 4 9.4	−0.7104	0.5500	0.1424	+ 4	−65
p Tauri	5.6	4.94	21.2	26 15.6	15 12.0	+ 4 28.1	−0.5275	0.5573	0.1219	+15	−54
φ Tauri	5.0	+5.01	+20.4	+27 8.9	19 15.9	+ 8 23.2	−0.9989	0.5605	+0.1120	−16	−63
χ Tauri	5.3	4.97	20.0	25 25.8	20 14.4	+ 9 19.5	+0.9414	0.5612	0.1095	+90	+27
17 B. Aurigæ	6.0	5.17	17.0	27 45.4	12 8 50.2	− 2 32.5	−0.3609	0.5701	0.0764	+24	−40
38 B. Aurigæ	6.5	5.20	15.6	27 34.8	13 42.0	+ 2 8.2	+0.1663	0.5729	0.0628	+54	−11
47 B. Aurigæ	6.0	5.23	15.1	27 55.5	15 46.7	+ 4 8.1	−0.0755	0.5740	0.0569	+40	−23
354 B. Tauri	6.4	+5.25	+13.7	+27 52.4	20 20.2	+ 8 31.1	+0.2086	0.5763	+0.0437	+57	− 7
22 Aurigæ	6.4	5.30	13.4	28 51.5	21 17.0	+ 9 25.7	−0.7902	0.5767	0.0409	− 2	−61
β Tauri	1.8	5.30	13.0	28 32.3	22 27.6	+10 33.6	−0.4063	0.5773	0.0375	+21	−40
107 B. Aurigæ	6.5	5.28	11.8	27 36.6	13 2 20.7	− 9 42.4	+0.6955	0.5788	0.0260	+90	+20
116 B. Aurigæ	5.9	5.35	11.5	29 10.1	3 40.1	− 8 26.1	−0.9141	0.5793	0.0220	−11	−61
406 B. Tauri	5.6	+5.32	+10.1	+27 56.7	8 20.4	− 3 56.7	+0.4425	0.5807	+0.0079	+74	+ 8

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

The Star's					At Conjunction in R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.		Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		Δα	Δδ									
		s	″	° ′	d	h m	h m				°	°
136 Tauri	4.6	+5.30	+ 9.8	+27 35.7	**13**	9 17.0	− 3 2.3	+0.8162	0.5809	+0.0051	+90	+29
154 B. Aurigæ	6.4	5.37	9.3	28 55.9		10 32.8	− 1 49.5	−0.5828	0.5812	+0.0012	+11	−49
415 B. Tauri	6.1	5.31	8.8	27 34.3		12 20.0	− 0 6.5	+0.8418	0.5816	−0.0042	+90	+30
183 B. Aurigæ	6.3	5.40	8.0	29 31.3		14 25.6	+ 1 54.2	−1.2188	0.5820	0.0106	−42	−60
49 Aurigæ	5.1	5.34	4.3	28 5.5	**14**	1 51.0	−11 7.5	−0.0420	0.5826	0.0456	+42	−20
53 Aurigæ	5.6	+5.38	+ 3.8	+29 3.6		3 5.6	− 9 55.9	−1.1110	0.5825	−0.0494	−27	−61
54 Aurigæ	5.8	5.35	3.7	28 20.5		3 34.0	− 9 28.6	−0.3849	0.5825	0.0508	+22	−39
28 Geminorum	5.5	5.38	+ 2.9	29 3.6		5 36.8	− 7 30.6	−1.2439	0.5823	0.0570	−45	−61
47 Geminorum	5.6	5.25	− 0.5	27 0.0		16 13.1	+ 2 40.7	+0.1272	0.5802	0.0887	+52	−15
53 Geminorum	5.9	5.29	1.1	28 3.0		18 1.4	+ 4 24.8	−1.1259	0.5797	0.0940	−28	−62
134 B. Geminorum	6.5	+5.24	− 1.3	+26 50.8		18 28.8	+ 4 51.0	+0.0782	0.5795	−0.0953	+49	−18
59 Geminorum	5.7	5.26	2.2	27 48.4		21 28.1	+ 7 43.4	−1.2135	0.5785	0.1039	−38	−62
υ Geminorum	4.3	5.19	3.8	27 5.3	**15**	2 3.0	−11 52.4	−0.9750	0.5767	0.1168	−14	−63
Mars	−1.0	....	....	24 50.6		4 48.6	− 9 13.1	+1.0190	0.5885	0.1287	+90	+31
c Geminorum	5.5	5.12	4.6	25 59.4		5 22.6	− 8 40.4	−0.2428	0.5753	0.1260	+31	−38
κ Geminorum	3.7	+5.06	− 4.4	+24 36.4		5 32.0	− 8 31.4	+1.1682	0.5752	−0.1264	+90	+43
ω Cancri	5.9	5.05	6.7	25 37.8		12 14.0	− 2 4.8	−0.7969	0.5719	0.1443	− 1	−64
5 B. Cancri	6.4	4.98	6.4	23 49.3		12 17.7	− 2 1.2	+1.0598	0.5719	0.1445	+90	+32
4 Cancri	6.2	5.04	6.7	25 19.7		12 34.0	− 1 45.5	−0.5336	0.5717	0.1452	+15	−56
35 B. Cancri	6.4	4.91	7.9	23 23.9		17 31.5	+ 3 0.8	+0.7039	0.5690	0.1578	+90	+ 8
λ Cancri	5.9	+4.92	− 8.9	+24 17.7		20 21.1	+ 5 44.0	−0.6750	0.5674	−0.1648	+ 7	−65
γ Cancri	4.7	4.72	11.1	21 46.7	**16**	5 57.1	− 9 1.3	+0.2207	0.5615	0.1870	+57	−20
8 Leonis	5.9	4.29	15.6	16 49.4	**17**	5 25.7	−10 22.8	+0.3492	0.5466	0.2318	+65	−19
34 Leonis	6.4	4.01	18.0	13 46.8		21 10.4	+ 4 49.8	−0.3786	0.5377	0.2539	+25	−60
37 Leonis	5.5	3.99	18.5	14 9.4		23 30.3	+ 7 5.0	−1.3578	0.5366	0.2567	−43	−76
45 Leonis	5.8	+3.84	−18.1	+10 12.1	**18**	4 38.2	−11 57.3	+1.3379	0.5342	−0.2622	+90	+41
ρ Leonis	3.8	3.79	18.4	9 45.0		7 3.4	− 9 36.9	+1.1696	0.5331	0.2646	+90	+23
56 Leonis	6.1	3.60	19.0	6 38.7		18 2.7	+ 1 0.9	+1.3538	0.5290	0.2737	+90	+41
c Leonis	5.1	3.57	19.3	6 33.8		20 17.8	+ 3 11.6	+0.8178	0.5283	0.2752	+90	− 1
χ Leonis	4.7	3.54	20.1	7 48.1		22 20.6	+ 5 10.5	−1.0037	0.5277	0.2765	− 9	−82
80 Leonis	6.4	+3.39	−20.1	+ 4 20.0	**19**	8 20.2	− 9 9.0	−0.2717	0.5256	−0.2812	+30	−59
83 Leonis	6.3	3.33	19.7	3 28.9		8 48.7	− 8 41.5	+0.4588	0.5256	0.2813	+71	−21
τ Leonis	5.2	3.37	19.9	3 19.8		9 20.8	− 8 10.4	+0.4622	0.5255	0.2815	+71	−20
89 Leonis	5.7	3.32	20.4	3 32.3		12 27.3	− 5 9.9	−0.6252	0.5251	0.2825	+12	−83
9 B. Virginis	6.2	3.20	19.8	0 9.6		19 32.2	+ 1 41.6	+0.7955	0.5247	0.2837	+90	− 3
27 B. Virginis	6.5	+3.17	−20.5	+ 1 0.5	**20**	0 22.6	+ 6 22.7	−1.4393	0.5248	−0.2839	−55	−89
31 B. Virginis	6.4	3.14	19.9	− 1 17.2		1 19.6	+ 7 17.9	+0.6184	0.5248	0.2838	+83	−13
162 B. Virginis	6.2	2.97	19.8	4 8.4		14 14.4	− 4 12.0	−0.1451	0.5265	0.2813	+36	−52
200 B. Virginis	6.3	2.96	19.8	4 34.7		16 3.1	− 2 26.8	−0.2092	0.5269	0.2806	+33	−56
f Virginis	6.0	2.92	19.7	5 21.5		18 30.5	− 0 4.2	−0.1076	0.5275	0.2796	+38	−50
319 B. Virginis	6.3	+2.88	−19.9	− 5 49.9		23 38 0	+ 4 53.5	−1.0546	0.5290	−0.2770	−14	−90
ψ Virginis	5.0	2.83	18.9	9 4.3	**21**	2 50.6	+ 7 59.8	+1.3426	0.5301	0.2750	+81	+38
49 Virginis	5.2	2.77	18.7	10 16.8		9 12.7	− 9 50.6	+0.8304	0.5326	0.2704	+80	− 1
g Virginis	5.6	2.77	19.4	8 31.4		9 31.4	− 9 32 4	−1.0342	0.5327	0.2701	−14	−90
50 Virginis	6.2	2.76	18.9	9 52.2		10 5.1	− 8 59.8	+0.1792	0.5330	0.2696	+51	−35
α Virginis	1.2	+2.70	−18.9	−10 42.8		17 15.6	− 2 3.7	−0.8794	0.5364	−0.2630	− 5	−90
i Virginis	5.7	2.68	18.4	12 15.6		17 57.6	− 1 23.0	+0.5055	0.5367	0.2623	+69	−18
550 B. Virginis	6.0	2.66	18.3	12 46.4		21 36.7	+ 2 8.8	+0.0753	0.5386	0.2583	+44	−40
214 G. Virginis	6.5	2.56	17.5	15 55.5	**22**	11 23.2	− 8 32.8	−0.1690	0.5468	0.2403	+29	−54
40 H. Virginis	5.1	2.54	17.5	15 53.8		13 52.6	− 6 8.6	−0.7913	0.5484	0.2365	− 4	−90
43 H. Virginis	5.5	+2.53	−16.9	−17 48.0		15 52.5	− 4 12.9	+0.6721	0.5497	−0.2333	+72	− 9
231 G. Virginis	6.4	2.53	16.7	18 11.2		16 36.0	− 3 31.0	+0.8954	0.5502	0.2321	+72	+ 4
236 G. Virginis	5.7	2.52	16.8	18 19.1		17 17.6	− 2 50.9	+0.8689	0.5506	0.2310	+72	+ 3
9 G. Libræ	6.5	2.49	16.2	20 3.7	**23**	0 19.6	+ 3 56.2	+1.0601	0.5554	0.2187	+70	+16
17 G. Libræ	6.4	2.46	16.0	20 48.7		5 11.0	+ 8 37.1	+0.7828	0.5587	0.2094	+69	− 2
18 G. Libræ	6.1	+2.46	−15.9	−20 57.9		5 37.6	+ 9 2.7	+0.8459	0.5591	−0.2086	+69	+ 2

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

The Star's					At Conjunction in R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0. Δα	Red'ns from 1913.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		s	″	° ′	d h m	h m				°	°
43 B. Libræ	5.7	+2.52	−17.5	−21 1.7	23 9 55.2	−10 49.1	+0.0346	0.5621	−0.1998	+35	−42
47 G. Libræ	6.1	2.44	15.5	21 41.9	13 43.6	− 7 9.1	−0.0291	0.5646	0.1916	+30	−46
64 G. Libræ	5.8	2.42	15.2	22 4.9	17 51.5	− 3 10.5	−0.4101	0.5675	0.1823	+10	−70
153 B. Libræ	6.3	2.41	14.5	24 11.9	24 0 43.2	+ 3 25.8	+0.5540	0.5719	0.1658	+59	−14
169 B. Libræ	6.0	2.40	14.7	22 51.5	2 37.8	+ 5 16.0	−1.1278	0.5731	0.1611	−35	−90
177 B. Libræ	6.2	+2.39	−14.6	−22 52.2	3 15.7	+ 5 52.4	−1.2161	0.5735	−0.1594	−44	−90
42 Libræ	5.0	2.40	14.5	23 32.4	3 37.7	+ 6 13.6	−0.5902	0.5737	0.1585	+ 2	−85
b Scorpii	4.7	2.40	13.8	25 29.5	7 55.2	+10 21.2	+0.7478	0.5763	0.1474	+65	− 2
A Scorpii	4.6	2.40	13.8	25 4.3	8 59.0	+11 22.6	+0.1635	0.5769	0.1445	+35	−35
31 B. Scorpii	5.4	2.39	14.0	24 16.7	9 6.5	+11 29.8	−0.6660	0.5769	0.1442	− 7	−90
32 B. Scorpii	5.3	+2.38	−14.1	−23 43.4	9 7.7	+11 30.9	−1.2371	0.5769	−0.1442	−48	−90
3 Scorpii	5.9	2.39	13.8	24 59.4	9 24.2	+11 46.7	+0.0197	0.5771	0.1434	+28	−43
4 Scorpii	5.7	2.40	13.6	26 0.8	9 43.7	−11 54.5	+1.0204	0.5773	0.1426	+64	+17
40 B. Scorpii	5.4	2.39	13.8	24 35.1	10 58.7	−10 42.4	−0.6181	0.5779	0.1392	− 5	−89
π Scorpii	3.0	2.40	13.6	25 52.1	11 4.2	−10 37.1	+0.6827	0.5780	0.1389	+63	− 6
48 B. Scorpii	4.9	+2.39	−13.5	−25 37.6	12 52.1	− 8 53.4	+0.1908	0.5790	−0.1340	+36	−34
50 B. Scorpii	6.4	2.39	13.7	24 29.4	13 6.5	− 8 39.5	−1.0049	0.5791	0.1334	−29	−90
65 B. Scorpii	5.5	2.41	13.2	26 5.9	14 45.4	− 7 4.6	+0.4245	0.5799	0.1288	+48	−21
85 B. Scorpii	6.0	2.39	13.2	25 15.6	17 27.2	− 4 29.1	−0.7709	0.5813	0.1212	−15	−90
σ Scorpii	3.1	2.38	−13.0	25 23.3	19 56.3	− 2 5.8	−0.9324	0.5824	−0.1141	−26	−90
				NEW	*MOON.*						
36 B. Capricorni	6.2	+2.61	+ 1.0	−22 40.8	29 0 23.0	− 1 31.2	−0.2887	0.5442	+0.1684	+16	−61
17 Capricorni	5.8	2.63	2.2	21 49.8	8 1.8	+ 5 52.1	+0.1444	0.5372	0.1827	+39	−36
20 Capricorni	6.2	2.62	3.6	19 22.3	14 22.5	−11 59.6	−1.3031	0.5313	0.1935	−48	−90
η Capricorni	4.8	+2.65	+ 3.7	−20 11.9	16 39.3	− 9 47.3	+0.0309	0.5293	+0.1971	+35	−42
27 Capricorni	6.1	2.69	3.9	20 54.3	19 6.6	− 7 24.7	+1.2813	0.5271	0.2009	+69	+38
30 Capricorni	5.4	2.65	5.1	18 20.9	23 13.6	− 3 25.5	−0.6357	0.5235	0.2070	+ 3	−88
31 Capricorni	6.3	2.65	5.2	17 49.6	23 22.9	− 3 16.5	−1.1678	0.5233	0.2072	−31	−90
γ Capricorni	3.8	2.71	6.8	17 3.2	30 10 14.6	+ 7 15.1	+0.3232	0.5142	0.2212	+54	−27
45 Capricorni	5.8	+2.67	+ 7.6	−15 8.8	12 16.0	+ 9 12.8	−1.2965	0.5126	+0.2236	−41	−90
δ Capricorni	3.0	2.73	7.2	16 31.2	13 46.8	+10 40.9	+0.5350	0.5114	0.2253	+67	−16
ι Aquarii	4.4	2.74	9.2	14 17.4	23 52.6	− 3 31.2	+0.4365	0.5039	0.2354	+63	−22
42 Aquarii	5.5	2.76	10.2	13 15.8	31 5 22.8	+ 1 49.6	+0.6256	0.5002	0.2401	+75	−12
σ Aquarii	4.9	2.77	11.7	11 7.2	12 51.1	+ 9 5.2	+0.0980	0.4956	0.2456	+46	−39
58 Aquarii	6.4	+2.78	+11.7	−11 20.9	13 24.8	+ 9 38.0	+0.4857	0.4952	+0.2460	+68	−19
213 B. Aquarii	6.5	+2.79	+13.2	− 8 45.8	19 39.3	− 8 17.9	−0.8009	0.4918	+0.2497	+ 1	−90

OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1913.

Date.	The Star's		Immersion.				Emersion.				Duration of Occultation
			Washington		Angle from—		Washington		Angle from—		
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.	
			h m	h m	°	°	h m	h m	°	°	h m
Jan. 2	42 Libræ	5.0	11 23	16 33	74	119	12 11	17 21	343	22	0 48
19	406 B. Tauri	5.6	10 33	14 37	99	39	11 31	15 34	276	219	0 57
20	49 Aurigæ	5.1	0 29	4 31	6	60	0 40	4 42	342	38	0 11
21	*c* Geminorum	5.5	1 2	5 0	91	143	1 56	5 53	274	330	0 53
21	4 Cancri	6.2	9 15	13 11	88	41	10 19	14 15	318	261	1 4
23	34 Leonis	6.4	13 32	17 19	174	123	14 12	17 59	254	201	0 40
24	χ Leonis	4.7	11 41	15 25	118	102	12 51	16 34	321	287	1 9
25	β Virginis	3.8	6 54	10 35	101	151	7 52	11 32	324	12	0 57
26	319 B. Virginis	6.3	10 38	14 14	125	156	11 52	15 28	316	330	1 14
Feb. 11	π Piscium	5.6	5 46	8 20	40	347	6 48	9 22	269	216	1 2
12	27 Arietis ‡	6.4	9 22	11 51	86	36	10 14	12 44	244	199	0 53
15	38 B. Aurigæ	6.5	2 44	5 3	42	103	3 52	6 10	284	332	1 7
15	47 B. Aurigæ	6.0	5 59	8 17	17	334	6 33	8 51	330	276	0 34
15	354 B. Tauri	6.4	11 17	13 34	31	336	11 42	13 59	337	284	0 25
18	λ Cancri	5.9	3 45	5 52	108	166	4 50	6 57	273	332	1 5
21	89 Leonis	5.7	14 18	16 11	118	76	15 21	17 14	314	266	1 3
22	162 B. Virginis	6.2	15 25	17 14	205	165	15 39	17 28	228	186	0 14
23	*g* Virginis †	5.6	7 5	8 52	129	180	7 59	9 46	294	343	0 54
25	47 G. Libræ	6.1	13 16	14 54	99	121	14 29	16 7	325	332	1 13
26	48 B. Scorpii	4.9	14 10	15 44	52	74	14 46	16 20	359	14	0 36
Mar. 3	56 B. Capricorni †	6.3	15 34	16 48	73	122	16 46	18 0	266	307	1 12
12	47 Arietis	5.8	6 8	6 48	46	351	7 16	7 56	276	219	1 8
13	28 Tauri	5.2	5 0	5 36	135	91	5 39	6 15	189	137	0 39
17	ω Cancri	5.9	9 15	9 35	65	17	10 4	10 23	343	287	0 48
17	4 Cancri	6.2	9 42	10 2	113	59	10 54	11 13	296	236	1 11
19	34 Leonis	6.4	15 28	15 39	132	78	16 19	16 30	287	235	0 51
22	319 B. Virginis	6.3	11 4	11 4	71	96	11 40	11 40	11	28	0 36
Apr. 12	49 Aurigæ	5.1	8 22	7 0	142	83	9 22	7 59	242	180	0 59
17	89 Leonis	5.7	15 15	13 32	100	53	16 11	14 28	327	276	0 56
18	162 B. Virginis	6.2	16 28	14 41	165	118	17 14	15 27	259	210	0 46
19	*g* Virginis	5.6	8 11	6 21	113	162	9 9	7 19	315	0	0 58
21	47 G. Libræ	6.1	12 32	10 34	108	139	13 43	11 44	316	333	1 10
22	48 B. Scorpii	4.9	11 44	9 42	105	149	12 48	10 46	306	343	1 4
22	65 B. Scorpii	5.5	14 17	12 14	96	118	15 33	13 30	312	318	1 16
25	183 B. Sagittarii	6.2	15 25	13 10	120	160	16 34	14 19	240	269	1 9
29	182 B. Aquarii	6.2	18 49	16 18	27	68	19 56	17 25	273	306	1 7
May 14	χ Leonis	4.7	8 26	4 58	128	170	9 41	6 12	306	333	1 14
June 12	*f* Virginis	6.0	13 29	8 6	150	134	14 40	9 17	289	258	1 11
13	550 B. Virginis ‡	6.0	17 53	12 26	112	65	18 56	13 28	298	247	1 2
18	C.D.−28°14268 †	6.4	13 17	7 31	52	101	14 2	8 16	326	10	0 45
21	χ Capricorni	5.3	20 46	14 47	108	112	21 42	15 43	187	178	0 56
21	27 Capricorni	6.1	22 26	16 26	357	339	23 7	17 8	297	271	0 42
22	152 B. Capricorni	6.5	17 11	11 8	5	52	17 43	11 40	313	357	0 32
24	317 B. Aquarii	6.3	19 18	13 6	4	50	20 1	13 50	291	333	0 44
July 13	π Scorpii	3.0	16 26	9 1	105	98	17 51	10 26	289	264	1 25
17	ω Sagittarii	4.8	19 56	12 14	114	113	20 55	13 13	200	186	0 59

Note.—The angles of position are counted from the north point and vertex of the Moon's limb, toward the east.

† Immersion below the horizon of Washington.
‡ Emersion below the horizon of Washington.

OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1913.

Date.	The Star's		Immersion.				Emersion.				Duration of Occultation.
			Washington		Angle from—		Washington		Angle from—		
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.	
			h m	h m	°	°	h m	h m	°	°	h m
July 21	*h* Aquarii	5.4	20 3	12 5	9	47	20 58	13 0	282	311	0 55
27	16 Tauri	5.4	0 56	16 34	16	73	1 48	17 26	288	341	0 52
27	17 Tauri	3.8	0 35	16 13	58	116	1 50	17 28	247	299	1 15
29	107 B. Aurigæ †	6.5	21 49	13 20	105	150	22 34	14 4	234	284	0 44
Aug. 8	17 G. Libræ	6.4	17 4	7 57	120	90	18 19	9 11	284	243	1 14
8	18 G. Libræ	6.1	17 47	8 39	131	95	18 54	9 46	268	223	1 7
18	337 B. Aquarii	6.4	17 47	8 0	42	93	18 48	9 1	261	310	1 1
18	342 B. Aquarii	6.5	19 32	9 44	2	47	20 14	10 26	291	333	0 42
21	π Piscium †	5.6	18 26	8 27	68	117	19 20	9 21	236	288	0 54
27	134 B. Geminorum	6.5	23 56	13 33	91	139	0 48	14 25	270	322	0 52
Sept. 11	27 Capricorni	6.1	23 48	12 26	62	29	0 59	13 36	231	189	1 10
12	152 B. Capricorni	6.5	18 48	7 22	52	88	20 12	8 46	250	271	1 24
14	317 B. Aquarii	6.3	21 23	9 49	118	147	21 52	10 18	158	180	0 29
19	47 Arietis	5.8	20 23	8 30	30	81	21 8	9 15	278	332	0 45
20	η Tauri †	3.0	19 43	7 46	58	101	20 31	8 33	63	311	0 47
20	27 Tauri †	3.7	20 19	8 22	99	146	21 4	9 6	219	270	0 44
20	28 Tauri †	5.2	20 20	8 22	81	128	21 10	9 13	237	289	0 51
24	4 Cancri	6.2	4 36	16 21	59	119	5 32	17 17	324	21	0 56
Oct. 5	*W* Sagitt. (*var.*) ‡	4.3	21 30	8 33	127	89	22 15	9 19	211	166	0 46
7	ω Sagittarii	4.8	19 15	6 11	84	91	20 42	7 37	233	222	1 26
11	*h* Aquarii	5.4	20 20	7 0	41	77	21 42	8 22	243	264	1 22
11	ϕ Aquarii ‡	4.4	4 1	14 40	87	38	4 55	15 34	209	158	0 54
16	ε Arietis (*mean*)	4.6	7 15	17 34	31	334	8 5	18 24	299	243	0 50
17	16 Tauri	5.4	2 44	13 0	90	127	4 5	14 20	221	202	1 20
17	*q* Tauri	4.3	3 7	13 22	62	86	4 36	14 51	251	214	1 29
17	20 Tauri	4.1	3 29	13 45	98	107	4 47	15 2	218	178	1 17
17	21 Tauri	5.8	3 39	13 54	59	60	5 7	15 22	258	210	1 28
17	22 Tauri	6.5	3 42	13 57	68	66	5 12	15 27	250	201	1 30
20	49 Aurigæ	5.1	1 52	11 56	74	135	3 0	13 4	275	338	1 8
20	54 Aurigæ	5.8	4 31	14 35	20	80	4 59	15 2	341	37	0 27
21	*c* Geminorum	5.5	7 0	16 59	96	127	8 23	18 22	302	267	1 23
25	80 Leonis	6.4	7 27	17 10	121	170	8 33	18 16	308	350	1 6
Nov. 8	342 B. Aquarii	6.5	20 0	4 50	44	87	21 18	6 7	242	275	1 17
15	354 B. Tauri	6.4	3 44	12 5	94	149	5 8	13 29	246	255	1 24
17	47 Geminorum	5.6	0 0	8 14	33	81	0 29	8 43	326	18	0 29
17	134 B. Geminorum	6.5	2 5	10 18	77	136	3 9	11 22	284	345	1 4
20	34 Leonis	6.4	5 57	13 58	50	103	6 24	14 25	4	56	0 27
Dec. 5	ϕ Aquarii	4.4	20 4	3 8	32	72	21 19	4 22	255	283	1 14
5	96 Aquarii	5.7	0 28	7 31	61	41	1 47	8 50	217	182	1 19
7	60 Piscium	6.2	3 41	10 36	104	60	4 32	11 27	190	142	0 51
7	62 Piscium	6.1	4 53	11 47	13	323	5 42	12 36	286	234	0 49
10	47 Arietis	5.8	21 47	4 31	50	106	22 48	5 32	252	308	1 1
11	23 Tauri †	4.3	20 7	2 48	56	102	20 56	3 36	264	314	0 48
11	η Tauri	3.0	20 39	3 20	42	90	21 26	4 6	277	329	0 46
11	27 Tauri	3.7	21 12	3 52	84	135	22 4	4 44	232	287	0 52
11	28 Tauri	5.2	21 15	3 55	66	118	22 9	4 49	249	305	0 54
12	38 B. Aurigæ	6.5	7 31	14 6	74	13	8 43	15 18	288	226	1 12
13	406 B. Tauri	5.6	0 2	6 33	68	125	1 0	7 31	270	330	0 58
15	35 B. Cancri	6.4	11 57	18 19	130	71	12 57	19 19	282	224	1 0
21	ι Virginis	5.7	10 34	16 33	122	157	11 44	17 43	315	338	1 10
31	42 Aquarii	5.5	0 21	5 42	78	49	1 28	6 48	207	168	1 6

NOTE.—The angles of position are counted from the north point and vertex of the Moon's limb, toward the east.

† Immersion below the horizon of Washington.
‡ Emersion below the horizon of Washington.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE SUN.

FOR WASHINGTON MEAN NOON.

Date.	P	B_0	L_0	Date.	P	B_0	L_0
	°	°	°		°	°	°
Jan. 1	+ 1.90	−3.19	3.37	July 5	− 0.79	+3.45	81.56
6	− 0.54	3.76	297.53	10	+ 1.48	3.97	15.39
11	2.96	4.29	231.69	15	3.73	4.46	309.22
16	5.33	4.79	165.85	20	5.93	4.92	243.07
21	7.63	5.26	100.02	25	8.08	5.34	176.92
26	− 9.85	−5.68	34.19	30	+10.15	+5.73	110.78
31	11.97	6.06	328.36	Aug. 4	12.14	6.08	44.66
Feb. 5	13.98	6.38	262.52	9	14.03	6.39	338.55
10	15.86	6.66	196.69	14	15.82	6.66	272.45
15	17.61	6.89	130.85	19	17.49	6.87	206.37
20	−19.22	−7.06	65.00	24	+19.04	+7.04	140.30
25	20.68	7.18	359.15	29	20.46	7.16	74.24
Mar. 2	21.98	7.24	293.29	Sept. 3	21.75	7.23	8.19
7	23.13	7.25	227.42	8	22.89	7.25	302.16
12	24.11	7.20	161.53	13	23.88	7.21	236.14
17	−24.93	−7.09	95.62	18	+24.72	+7.12	170.13
22	25.57	6.93	29.70	23	25.40	6.98	104.14
27	26.04	6.72	323.76	28	25.92	6.79	38.15
Apr. 1	26.33	6.47	257.80	Oct. 3	26.26	6.55	332.18
6	26.44	6.16	191.82	8	26.42	6.26	266.21
11	−26.36	−5.81	125.82	13	+26.40	+5.92	200.25
16	26.11	5.42	59.80	18	26.20	5.54	134.30
21	25.67	4.99	353.76	23	25.80	5.11	68.36
26	25.05	4.53	287.70	28	25.21	4.64	2.42
May 1	24.24	4.03	221.62	Nov. 2	24.42	4.14	296.49
6	−23.25	−3.51	155.53	7	+23.43	+3.60	230.56
11	22.08	2.96	89.41	12	22.25	3.04	164.64
16	20.75	2.40	23.29	17	20.88	2.45	98.73
21	19.26	1.82	317.15	22	19.32	1.84	32.83
26	17.61	1.22	250.99	27	17.59	1.22	326.93
31	−15.82	−0.62	184.83	Dec. 2	+15.69	+0.58	261.03
June 5	13.90	−0.02	118.65	7	13.65	−0.06	195.15
10	11.88	+0.58	52.47	12	11.48	0.70	129.27
15	9.77	1.18	346.29	17	9.21	1.33	63.39
20	7.58	1.77	280.11	22	6.86	1.96	357.53
25	− 5.35	+2.35	213.92	27	+ 4.46	−2.57	291.67
30	− 3.08	+2.91	147.74	32	+ 2.02	−3.16	225.82

In the above table, P is the position-angle of the axis of rotation measured eastward from the north point of the disk, while L_0 and B_0 are the heliographic longitudes and latitudes, respectively, of the center of the disk. The longitudes are reckoned from the Solar Meridian which passed through the ascending node of the Sun's equator on the ecliptic, on Jan. 1, 1854, Greenwich Mean Noon.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR WASHINGTON MEAN MIDNIGHT.

Date.		The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		*C*
		Long.	Lat.	Long.	Lat.	Colong.	Lat.	
		°	°	°	°	°	°	°
Jan.	1	+6.00	+3.60	+0.01	+0.03	203.20	−1.52	17.21
	2	5.82	4.74	0.01	0.03	215.37	1.52	13.72
	3	5.46	5.63	0.01	0.03	227.55	1.53	9.38
	4	4.94	6.23	0.01	0.03	239.73	1.53	4.42
	5	4.25	6.52	0.01	0.03	251.92	1.53	359.17
	6	+3.41	+6.51	+0.01	+0.03	264.10	−1.53	354.03
	7	2.42	6.20	0.01	0.03	276.29	1.53	349.36
	8	1.28	5.62	+0.01	0.03	288.48	1.53	345.43
	9	+0.01	4.79	0.00	0.03	300.67	1.52	342.35
	10	−1.36	3.76	0.00	0.03	312.85	1.52	340.13
	11	−2.77	+2.58	0.00	+0.03	325.03	−1.51	338.74
	12	4.16	+1.28	0.00	0.03	337.20	1.50	338.12
	13	5.45	−0.09	0.00	0.03	349.37	1.49	338.26
	14	6.54	1.48	0.00	0.03	1.53	1.48	339.18
	15	7.34	2.83	0.00	0.03	13.68	1.47	340.97
	16	−7.76	−4.08	0.00	+0.03	25.83	−1.46	343.74
	17	7.71	5.15	0.00	0.03	37.98	1.44	347.59
	18	7.15	5.97	0.00	0.02	50.11	1.43	352.53
	19	6.07	6.46	0.00	0.02	62.25	1.41	358.36
	20	4.54	6.54	0.00	0.02	74.38	1.40	4.57
	21	−2.66	−6.18	0.00	+0.02	86.50	−1.38	10.44
	22	−0.61	5.37	0.00	0.02	98.62	1.36	15.32
	23	+1.43	4.19	0.00	0.02	110.75	1.34	18.87
	24	3.28	2.72	0.00	0.02	122.88	1.33	21.04
	25	4.82	−1.09	0.00	0.02	135.01	1.31	21.92
	26	+5.97	+0.58	0.00	+0.02	147.15	−1.29	21.64
	27	6.72	2.16	0.00	0.02	159.30	1.28	20.30
	28	7.07	3.58	0.00	0.02	171.45	1.26	17.95
	29	7.07	4.77	0.00	0.02	183.62	1.25	14.65
	30	6.78	5.68	0.00	0.03	195.78	1.24	10.49
	31	+6.24	+6.30	0.00	+0.03	207.96	−1.23	5.66
Feb.	1	5.49	6.62	0.00	0.03	220.14	1.22	0.48
	2	4.57	6.63	0.00	0.03	232.32	1.21	355.32
	3	3.52	6.34	0.00	0.03	244.51	1.20	350.54
	4	2.34	5.77	0.00	0.03	256.70	1.19	346.43
	5	+1.07	+4.95	0.00	+0.03	268.90	−1.18	343.13
	6	−0.28	3.92	0.00	0.03	281.09	1.16	340.68
	7	1.67	2.73	−0.01	0.03	293.28	1.14	339.06
	8	3.07	1.42	0.01	0.03	305.47	1.13	338.22
	9	4.42	+0.04	0.01	0.03	317.66	1.11	338.14
	10	−5.66	−1.36	−0.01	+0.02	329.85	−1.09	338.83
	11	6.73	2.71	0.01	0.02	342.03	1.07	340.33
	12	7.54	3.97	0.01	0.02	354.20	1.04	342.73
	13	8.01	5.07	0.01	0.02	6.37	1.02	346.11
	14	8.07	5.93	0.01	0.02	18.53	1.00	350.53
	15	−7.66	−6.50	−0.01	+0.02	30.68	−0.97	355.88
	16	−6.75	−6.70	−0.01	+0.02	42.83	−0.94	1.83

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR WASHINGTON MEAN MIDNIGHT.

Date.		The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		*C*
		Long.	Lat.	Long.	Lat.	Colong.	Lat.	
		°	°	°	°	°	°	°
Feb.	16	−6.75	−6.70	−0.01	+0.02	42.83	−0.94	1.83
	17	5.38	6.49	0.01	0.02	54.98	0.91	7.80
	18	3.62	5.84	0.01	0.02	67.12	0.88	13.13
	19	−1.61	4.77	0.01	0.02	79.25	0.85	17.32
	20	+0.50	3.35	0.01	0.02	91.39	0.82	20.16
	21	+2.53	−1.69	−0.01	+0.02	103.52	−0.79	21.66
	22	4.29	+0.06	−0.01	0.02	115.66	0.76	21.89
	23	5.72	1.77	0.00	0.02	127.81	0.73	20.95
	24	6.73	3.33	0.00	0.02	139.96	0.70	18.90
	25	7.30	4.65	0.00	0.02	152.11	0.67	15.81
	26	+7.45	+5.66	0.00	+0.02	164.27	−0.65	11.78
	27	7.22	6.36	0.00	0.02	176.44	0.63	7.01
	28	6.66	6.74	0.00	0.02	188.62	0.61	1.82
Mar.	1	5.84	6.79	0.00	0.02	200.80	0.59	356.58
	2	4.80	6.53	0.00	0.02	212.99	0.57	351.68
	3	+3.61	+6.00	−0.01	+0.02	225.18	−0.55	347.40
	4	2.31	5.21	0.01	0.02	237.38	0.53	343.90
	5	+0.95	4.20	0.01	0.02	249.58	0.52	341.24
	6	−0.44	3.01	0.01	0.02	261.79	0.50	339.41
	7	1.81	1.69	0.01	0.02	274.00	0.47	338.37
	8	−3.13	+0.29	−0.01	+0.02	286.20	−0.45	338.09
	9	4.35	−1.13	0.01	0.02	298.41	0.43	338.58
	10	5.44	2.52	0.01	0.02	310.62	0.40	339.87
	11	6.35	3.82	0.01	0.02	322.82	0.38	342.02
	12	7.03	4.95	0.02	0.02	335.01	0.35	345.12
	13	−7.42	−5.86	−0.02	+0.02	347.21	−0.32	349.20
	14	7.48	6.49	0.02	0.02	359.39	0.29	354.18
	15	7.16	6.79	0.02	0.02	11.57	0.26	359.82
	16	6.45	6.70	0.02	0.02	23.74	0.23	5.65
	17	5.35	6.21	0.02	0.02	35.91	0.20	11.09
	18	−3.91	−5.31	−0.01	+0.02	48.07	−0.16	15.65
	19	2.21	4.03	0.01	0.02	60.23	0.13	19.03
	20	−0.36	2.46	0.01	0.02	72.38	0.09	21.11
	21	+1.51	−0.71	0.01	0.02	84.54	0.05	21.92
	22	3.26	+1.07	0.01	0.02	96.69	−0.01	21.52
	23	+4.77	+2.75	−0.01	+0.02	108.84	+0.02	19.95
	24	5.93	4.22	0.01	0.02	121.00	0.06	17.23
	25	6.68	5.39	0.01	0.02	133.16	0.09	13.44
	26	7.00	6.23	0.01	0.02	145.33	0.12	8.77
	27	6.91	6.71	0.01	0.02	157.50	0.14	3.54
	28	+6.44	+6.85	−0.01	+0.02	169.68	+0.17	358.16
	29	5.64	6.66	0.01	0.02	181.87	0.19	353.04
	30	4.59	6.18	0.01	0.02	194.07	0.21	348.53
	31	3.36	5.44	0.01	0.02	206.27	0.23	344.80
Apr.	1	2.00	4.48	0.01	0.02	218.48	0.25	341.91
	2	+0.61	+3.33	−0.01	+0.02	230.69	+0.27	339.85
	3	−0.77	+2.03	−0.01	+0.02	242.91	+0.29	338.59

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR WASHINGTON MEAN MIDNIGHT.

Date.		The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
		Long.	Lat.	Long.	Lat.	Colong.	Lat.	
		°	°	°	°	°	°	°
Apr.	1	+2.00	+4.48	−0.01	+0.02	218.48	+0.25	341.91
	2	+0.61	3.33	0.01	0.02	230.69	0.27	339.85
	3	−0.77	2.03	0.01	0.02	242.91	0.29	338.59
	4	2.08	+0.64	0.01	0.02	255.13	0.31	338.10
	5	3.26	−0.80	0.01	0.02	267.35	0.33	338.38
	6	−4.29	−2.21	−0.02	+0.02	279.57	+0.35	339.46
	7	5.13	3.54	0.02	0.02	291.80	0.37	341.40
	8	5.76	4.71	0.02	0.02	304.02	0.40	344.28
	9	6.14	5.67	0.02	0.02	316.24	0.42	348.15
	10	6.28	6.36	0.02	0.02	328.45	0.44	352.93
	11	−6.17	−6.73	−0.02	+0.02	340.66	+0.47	358.40
	12	5.79	6.73	0.02	0.02	352.87	0.50	4.14
	13	5.14	6.34	0.02	0.02	5.07	0.53	9.60
	14	4.25	5.58	0.02	0.02	17.26	0.56	14.32
	15	3.13	4.45	0.01	0.02	29.44	0.59	17.98
	16	−1.82	−3.02	−0.01	+0.02	41.62	+0.62	20.45
	17	−0.38	−1.38	0.01	0.02	53.80	0.66	21.73
	18	+1.12	+0.35	0.01	0.02	65.97	0.69	21.84
	19	2.57	2.05	0.01	0.02	78.14	0.73	20.80
	20	3.88	3.61	0.01	0.02	90.31	0.76	18.59
	21	+4.95	+4.91	−0.01	+0.02	102.48	+0.79	15.23
	22	5.70	5.89	−0.01	0.02	114.65	0.82	10.83
	23	6.08	6.50	0.00	0.02	126.83	0.85	5.67
	24	6.06	6.76	0.00	0.02	139.01	0.87	0.16
	25	5.65	6.67	−0.01	0.02	151.20	0.89	354.79
	26	+4.91	+6.26	−0.01	+0.02	163.39	+0.91	349.96
	27	3.88	5.58	0.01	0.02	175.59	0.93	345.91
	28	2.65	4.67	0.01	0.02	187.80	0.95	342.73
	29	+1.29	3.57	0.01	0.02	200.01	0.96	340.41
	30	−0.10	2.32	0.01	0.02	212.23	0.97	338.91
May	1	−1.45	+0.97	−0.01	+0.02	224.46	+0.99	338.18
	2	2.68	−0.44	0.01	0.02	236.68	1.00	338.21
	3	3.72	1.85	0.01	0.02	248.92	1.01	339.03
	4	4.53	3.19	0.01	0.02	261.16	1.03	340.72
	5	5.08	4.40	0.01	0.02	273.39	1.04	343.35
	6	−5.35	−5.41	−0.01	+0.02	285.63	+1.06	346.99
	7	5.35	6.15	0.01	0.02	297.87	1.07	351.62
	8	5.10	6.57	0.01	0.01	310.11	1.09	357.03
	9	4.65	6.63	0.01	0.01	322.34	1.10	2.80
	10	4.02	6.31	0.01	0.01	334.57	1.12	8.38
	11	−3.26	−5.61	−0.01	+0.01	346.79	+1.14	13.27
	12	2.40	4.57	0.01	0.01	359.00	1.16	17.15
	13	1.44	3.25	0.01	0.01	11.21	1.19	19.88
	14	−0.43	1.72	0.01	0.02	23.42	1.21	21.46
	15	+0.62	−0.08	0.01	0.02	35.61	1.23	21.93
	16	+1.69	+1.57	−0.01	+0.02	47.80	+1.26	21.31
	17	+2.72	+3.12	0.00	+0.02	59.99	+1.28	19.58

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR WASHINGTON MEAN MIDNIGHT.

Date.		The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
		Long.	Lat.	Long.	Lat.	Colong.	Lat.	
		°	°	°	°	°	°	°
May	17	+2.72	+3.12	0.00	+0.02	59.99	+1.28	19.58
	18	3.66	4.46	0.00	0.02	72.17	1.31	16.70
	19	4.43	5.51	0.00	0.02	84.35	1.33	12.72
	20	4.96	6.23	0.00	0.02	96.54	1.35	7.82
	21	5.20	6.58	0.00	0.02	108.72	1.37	2.36
	22	+5.11	+6.58	0.00	+0.02	120.91	+1.38	356.83
	23	4.67	6.26	0.00	0.02	133.10	1.40	351.69
	24	3.91	5.64	0.00	0.02	145.30	1.41	347.28
	25	2.88	4.78	0.00	0.02	157.50	1.42	343.75
	26	1.64	3.72	0.00	0.02	169.71	1.42	341.12
	27	+0.28	+2.51	0.00	+0.02	181.93	+1.43	339.34
	28	−1.11	+1.19	−0.01	0.01	194.15	1.43	338.35
	29	2.43	−0.18	0.01	0.01	206.38	1.44	338.11
	30	3.60	1.56	0.01	0.01	218.61	1.44	338.65
	31	4.53	2.89	0.01	0.01	230.85	1.44	340.02
June	1	−5.16	−4.11	−0.01	+0.01	243.09	+1.44	342.31
	2	5.45	5.15	0.01	0.01	255.34	1.45	345.62
	3	5.39	5.94	0.01	0.01	267.58	1.45	349.99
	4	5.00	6.42	0.01	0.01	279.83	1.45	355.28
	5	4.32	6.54	0.01	0.01	292.08	1.46	1.11
	6	−3.44	−6.27	−0.01	+0.01	304.33	+1.46	6.91
	7	2.44	5.61	0.01	0.01	316.58	1.46	12.11
	8	1.40	4.60	−0.01	0.01	328.82	1.47	16.31
	9	−0.37	3.31	0.00	0.01	341.05	1.48	19.33
	10	+0.60	1.82	0.00	0.01	353.28	1.49	21.18
	11	+1.51	−0.22	0.00	+0.01	5.50	+1.50	21.92
	12	2.33	+1.39	0.00	0.01	17.71	1.51	21.59
	13	3.07	2.90	0.00	0.01	29.92	1.52	20.20
	14	3.72	4.23	0.00	0.01	42.12	1.53	17.71
	15	4.25	5.30	0.00	0.01	54.31	1.54	14.14
	16	+4.63	+6.06	0.00	+0.01	66.50	+1.55	9.59
	17	4.82	6.47	0.00	0.01	78.70	1.56	4.33
	18	4.77	6.53	0.00	0.01	90.89	1.56	358.80
	19	4.45	6.26	0.00	0.01	103.08	1.56	353.48
	20	3.86	5.69	0.00	0.01	115.27	1.57	348.77
	21	+2.99	+4.86	0.00	+0.01	127.47	+1.56	344.91
	22	1.89	3.83	0.00	0.01	139.67	1.56	341.96
	23	+0.62	2.64	0.00	0.01	151.88	1.56	339.88
	24	−0.76	+1.34	0.00	0.01	164.09	1.55	338.61
	25	2.16	−0.01	0.00	0.01	176.31	1.54	338.11
	26	−3.48	−1.37	0.00	+0.01	188.53	+1.54	338.36
	27	4.63	2.69	0.00	0.01	200.76	1.53	339.40
	28	5.51	3.91	0.00	0.01	213.00	1.52	341.32
	29	6.05	4.97	0.00	0.01	225.24	1.51	344.22
	30	6.19	5.81	0.00	0.01	237.48	1.50	348.18
July	1	−5.91	−6.36	0.00	+0.01	249.73	+1.49	353.15
	2	−5.22	−6.55	0.00	+0.01	261.98	+1.48	358.88

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR WASHINGTON MEAN MIDNIGHT.

Date.		The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
		Long.	Lat.	Long.	Lat.	Colong.	Lat.	
		°	°	°	°	°	°	°
July	1	−5.91	−6.36	0.00	+0.01	249.73	+1.49	353.15
	2	5.22	6.55	0.00	0.01	261.98	1.48	358.88
	3	4.19	6.35	0.00	0.01	274.24	1.47	4.86
	4	2.91	5.75	0.00	0.01	286.49	1.46	10.44
	5	1.50	4.77	0.00	0.01	298.74	1.45	15.10
	6	−0.08	−3.47	0.00	+0.01	310.99	+1.44	18.57
	7	+1.25	1.95	0.00	0.01	323.24	1.44	20.80
	8	2.43	−0.32	0.00	0.01	335.48	1.43	21.84
	9	3.42	+1.32	0.00	0.01	347.71	1.42	21.77
	10	4.20	2.85	+0.01	0.01	359.93	1.42	20.63
	11	+4.79	+4.19	+0.01	+0.01	12.15	+1.42	18.42
	12	5.19	5.27	0.01	0.01	24.36	1.41	15.15
	13	5.40	6.05	0.01	0.01	36.56	1.41	10.90
	14	5.42	6.49	0.01	0.01	48.76	1.40	5.87
	15	5.24	6.60	0.01	0.01	60.96	1.40	0.44
	16	+4.85	+6.36	+0.01	+0.01	73.15	+1.39	355.07
	17	4.25	5.82	0.01	0.01	85.35	1.38	350.18
	18	3.42	5.02	0.01	0.01	97.54	1.37	346.06
	19	2.39	4.00	0.01	0.01	109.73	1.35	342.82
	20	+1.18	2.81	0.01	0.01	121.93	1.34	340.46
	21	−0.16	+1.51	+0.01	+0.01	134.13	+1.32	338.94
	22	1.58	+0.15	0.01	0.01	146.33	1.31	338.19
	23	2.99	−1.22	+0.01	0.01	158.54	1.29	338.19
	24	4.32	2.55	0.00	0.01	170.75	1.27	338.95
	25	5.47	3.78	0.00	0.01	182.97	1.25	340.53
	26	−6.36	−4.86	0.00	+0.01	195.20	+1.23	343.02
	27	6.89	5.74	0.00	0.01	207.42	1.21	346.52
	28	7.01	6.36	0.00	0.01	219.66	1.19	351.04
	29	6.66	6.65	0.00	0.01	231.90	1.17	356.44
	30	5.86	6.56	0.00	0.01	244.15	1.15	2.35
	31	−4.65	−6.06	0.00	+0.01	256.40	+1.13	8.18
Aug.	1	3.13	5.15	0.00	0.00	268.65	1.11	13.32
	2	−1.41	3.89	+0.01	0.00	280.90	1.09	17.36
	3	+0.36	2.35	0.01	0.00	293.15	1.07	20.12
	4	2.04	−0.65	0.01	0.00	305.39	1.05	21.61
	5	+3.53	+1.07	+0.01	0.00	317.64	+1.03	21.91
	6	4.76	2.69	0.01	0.00	329.87	1.01	21.06
	7	5.69	4.12	0.01	0.00	342.10	1.00	19.10
	8	6.31	5.27	0.02	+0.01	354.32	0.98	16.05
	9	6.62	6.10	0.02	0.01	6.54	0.96	11.99
	10	+6.66	+6.59	+0.02	+0.01	18.74	+0.95	7.12
	11	6.43	6.73	0.02	0.01	30.95	0.93	1.78
	12	5.96	6.53	0.02	0.01	43.14	0.91	356.40
	13	5.27	6.03	0.02	0.01	55.33	0.89	351.41
	14	4.39	5.26	0.02	0.01	67.52	0.87	347.11
	15	+3.33	+4.25	+0.02	+0.01	79.71	+0.85	343.64
	16	+2.12	+3.07	+0.02	+0.01	91.90	+0.83	341.05

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FOR WASHINGTON MEAN MIDNIGHT.

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		Long.	Lat.	Long.	Lat.	Colong.	Lat.	
		°	°	°	°	°	°	°
Aug.	16	+2.12	+3.07	+0.02	+0.01	91.90	+0.83	341.05
	17	+0.80	1.76	0.01	0.00	104.09	0.80	339.30
	18	−0.60	+0.38	0.01	0.00	116.27	0.78	338.33
	19	2.03	−1.01	0.01	0.00	128.46	0.75	338.11
	20	3.43	2.36	0.01	0.00	140.66	0.73	338.64
	21	−4.74	−3.63	+0.01	0.00	152.85	+0.70	339.95
	22	5.87	4.75	0.01	0.00	165.05	0.67	342.12
	23	6.75	5.67	0.01	0.00	177.26	0.65	345.23
	24	7.31	6.35	0.01	0.00	189.47	0.62	349.32
	25	7.48	6.73	0.01	0.00	201.69	0.60	354.31
	26	−7.21	−6.76	+0.01	0.00	213.92	+0.57	359.94
	27	6.49	6.40	0.01	0.00	226.14	0.54	5.76
	28	5.33	5.64	0.01	0.00	238.38	0.52	11.17
	29	3.79	4.49	0.01	0.00	250.62	0.49	15.70
	30	1.98	3.02	0.01	0.00	262.86	0.46	19.05
	31	−0.03	−1.32	+0.01	0.00	275.10	+0.44	21.12
Sept.	1	+1.91	+0.48	0.02	0.00	287.34	0.41	21.93
	2	3.69	2.23	0.02	0.00	299.58	0.38	21.53
	3	5.21	3.80	0.02	0.00	311.81	0.36	19.92
	4	6.39	5.09	0.02	0.00	324.04	0.33	17.13
	5	+7.17	+6.03	+0.02	0.00	336.26	+0.30	13.25
	6	7.56	6.61	0.02	0.00	348.47	0.28	8.47
	7	7.56	6.82	0.02	0.00	0.68	0.25	3.13
	8	7.22	6.69	0.02	0.00	12.88	0.23	357.69
	9	6.58	6.23	0.02	0.00	25.07	0.20	352.57
	10	+5.69	+5.50	+0.02	0.00	37.26	+0.18	348.10
	11	4.60	4.53	0.02	0.00	49.44	0.15	344.44
	12	3.36	3.37	0.02	0.00	61.62	0.12	341.64
	13	2.02	2.08	0.02	0.00	73.79	0.09	339.68
	14	+0.62	+0.70	0.02	0.00	85.97	0.07	338.51
	15	−0.80	−0.72	+0.02	0.00	98.14	+0.04	338.09
	16	2.19	2.10	0.01	0.00	110.32	+0.01	338.42
	17	3.50	3.39	0.01	0.00	122.49	−0.02	339.52
	18	4.70	4.55	0.01	0.00	134.67	0.05	341.46
	19	5.73	5.52	0.01	0.00	146.85	0.07	344.30
	20	−6.54	−6.25	+0.01	0.00	159.03	−0.10	348.07
	21	7.08	6.70	0.01	0.00	171.22	0.13	352.73
	22	7.29	6.82	0.01	0.00	183.42	0.15	358.07
	23	7.14	6.59	0.01	0.00	195.62	0.18	3.71
	24	6.59	5.98	0.01	0.00	207.82	0.21	9.16
	25	−5.64	−5.00	+0.01	0.00	220.03	−0.24	13.94
	26	4.31	3.68	0.01	0.00	232.25	0.26	17.72
	27	2.67	2.08	0.02	0.00	244.47	0.29	20.33
	28	−0.80	−0.31	0.02	0.00	256.70	0.32	21.71
	29	+1.16	+1.49	0.02	0.00	268.92	0.35	21.87
	30	+3.06	+3.18	+0.02	0.00	281.15	−0.37	20.79
Oct.	1	+4.77	+4.62	+0.02	0.00	293.37	−0.40	18.44

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR WASHINGTON MEAN MIDNIGHT.

Date.		The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		*C*
		Long.	Lat.	Long.	Lat.	Colong.	Lat.	
		°	°	°	°	°	°	°
Oct.	1	+4.77	+4.62	+0.02	0.00	293.37	−0.40	18.44
	2	6.16	5.73	0.02	0.00	305.59	0.43	14.87
	3	7.15	6.45	0.02	0.00	317.81	0.46	10.24
	4	7.69	6.78	0.02	0.00	330.02	0.48	4.88
	5	7.77	6.73	0.02	0.00	342.22	0.51	359.29
	6	+7.44	+6.35	+0.02	0.00	354.41	−0.54	353.94
	7	6.75	5.67	0.02	0.00	6.60	0.56	349.22
	8	5.76	4.74	0.02	0.00	18.78	0.59	345.32
	9	4.56	3.62	0.02	0.00	30.96	0.62	342.30
	10	3.22	2.36	0.02	0.00	43.13	0.64	340.12
	11	+1.81	+1.00	+0.02	0.00	55.29	−0.67	338.74
	12	+0.39	−0.39	0.02	0.00	67.45	0.70	338.12
	13	−0.99	1.77	0.01	0.00	79.61	0.72	338.25
	14	2.27	3.09	0.01	0.00	91.77	0.75	339.15
	15	3.42	4.28	0.01	0.00	103.92	0.77	340.87
	16	−4.42	−5.28	+0.01	0.00	116.08	−0.80	343.50
	17	5.23	6.06	0.01	0.00	128.24	0.82	347.07
	18	5.84	6.56	0.01	0.00	140.40	0.84	351.53
	19	6.23	6.74	0.01	0.00	152.56	0.86	356.70
	20	6.37	6.58	0.01	0.00	164.73	0.88	2.22
	21	−6.25	−6.08	+0.01	0.00	176.91	−0.90	7.64
	22	5.84	5.22	0.01	0.00	189.09	0.92	12.51
	23	5.12	4.04	0.01	0.00	201.27	0.94	16.51
	24	4.10	2.59	0.01	0.00	213.47	0.96	19.46
	25	2.78	−0.95	0.01	0.00	225.66	0.98	21.28
	26	−1.23	+0.78	+0.02	0.00	237.87	−1.00	21.96
	27	+0.48	2.48	0.02	0.00	250.08	1.02	21.45
	28	2.23	4.00	0.02	0.00	262.28	1.04	19.69
	29	3.89	5.24	0.02	0.00	274.49	1.06	16.65
	30	5.31	6.12	0.02	0.00	286.70	1.09	12.38
	31	+6.38	+6.59	+0.02	0.00	298.91	−1.11	7.16
Nov.	1	7.03	6.66	0.02	0.00	311.11	1.13	1.44
	2	7.21	6.36	0.02	0.00	323.30	1.15	355.81
	3	6.94	5.74	0.02	0.00	335.49	1.17	350.72
	4	6.27	4.86	0.02	0.00	347.67	1.19	346.47
	5	+5.28	+3.78	+0.02	0.00	359.85	−1.21	343.14
	6	4.05	2.56	0.02	0.00	12.02	1.23	340.69
	7	2.68	+1.23	0.01	0.00	24.18	1.25	339.07
	8	+1.25	−0.14	0.01	0.00	36.34	1.27	338.23
	9	−0.15	1.50	0.01	−0.01	48.49	1.29	338.13
	10	−1.45	−2.81	+0.01	−0.01	60.64	−1.31	338.79
	11	2.60	4.00	0.01	0.01	72.78	1.32	340.27
	12	3.55	5.03	0.01	0.01	84.92	1.34	342.66
	13	4.28	5.84	+0.01	0.01	97.06	1.35	346.01
	14	4.78	6.37	0.00	0.01	109.20	1.36	350.30
	15	−5.06	−6.60	0.00	−0.01	121.34	−1.37	355.38
	16	−5.14	−6.48	0.00	−0.01	133.48	−1.38	0.90

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR WASHINGTON MEAN MIDNIGHT.

Date.		The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
		Long.	Lat.	Long.	Lat.	Colong.	Lat.	
		°	°	°	°	°	°	°
Nov.	16	−5.14	−6.48	0.00	−0.01	133.48	−1.38	0.90
	17	5.04	6.02	0.00	0.01	145.63	1.39	6.40
	18	4.76	5.22	0.00	0.01	157.78	1.39	11.41
	19	4.31	4.12	+0.01	0.01	169.94	1.40	15.58
	20	3.69	2.76	0.01	0.01	182.10	1.40	18.74
	21	−2.88	−1.22	+0.01	−0.01	194.27	−1.41	20.84
	22	1.89	+0.41	0.01	0.00	206.44	1.42	21.86
	23	−0.72	2.04	0.01	0.00	218.62	1.43	21.78
	24	+0.58	3.55	0.01	0.00	230.81	1.44	20.56
	25	1.95	4.83	0.01	0.00	243.00	1.44	18.11
	26	+3.29	+5.79	+0.01	−0.01	255.20	−1.46	14.39
	27	4.48	6.37	0.01	0.01	267.40	1.47	9.55
	28	5.41	6.55	0.01	0.01	279.59	1.48	3.95
	29	5.98	6.34	0.01	0.01	291.78	1.49	358.14
	30	6.14	5.79	0.01	0.01	303.97	1.50	352.69
Dec.	1	+5.89	+4.96	+0.01	−0.01	316.16	−1.51	348.00
	2	5.25	3.90	0.01	0.01	328.34	1.52	344.25
	3	4.28	2.69	0.01	0.01	340.51	1.52	341.46
	4	3.06	1.38	0.01	0.01	352.68	1.53	339.54
	5	1.69	+0.02	+0.01	0.01	4.84	1.54	338.42
	6	+0.27	−1.33	0.00	−0.01	17.00	−1.55	338.06
	7	−1.11	2.63	0.00	0.01	29.15	1.56	338.46
	8	2.35	3.82	0.00	0.01	41.30	1.56	339.66
	9	3.39	4.86	0.00	0.01	53.43	1.56	341.73
	10	4.16	5.69	0.00	0.01	65.57	1.56	344.76
	11	−4.64	−6.26	0.00	−0.01	77.70	−1.56	348.79
	12	4.82	6.53	0.00	0.01	89.83	1.56	353.72
	13	4.73	6.45	0.00	0.01	101.95	1.55	359.24
	14	4.41	6.02	0.00	0.01	114.08	1.55	4.90
	15	3.91	5.24	0.00	0.01	126.21	1.54	10.18
	16	−3.28	−4.15	0.00	−0.01	138.35	−1.53	14.65
	17	2.57	2.80	0.00	0.01	150.48	1.52	18.08
	18	1.80	−1.27	0.00	0.01	162.63	1.50	20.44
	19	0.98	+0.34	0.00	0.01	174.78	1.50	21.72
	20	−0.12	1.93	0.00	0.01	186.94	1.48	21.93
	21	+0.79	+3.40	0.00	−0.01	199.10	−1.48	21.06
	22	1.73	4.67	0.00	0.01	211.27	1.47	19.04
	23	2.67	5.65	0.00	0.01	223.45	1.46	15.82
	24	3.56	6.29	0.00	0.01	235.63	1.46	11.45
	25	4.32	6.54	0.00	0.01	247.82	1.46	6.17
	26	+4.88	+6.41	0.00	−0.01	260.01	−1.45	0.43
	27	5.17	5.92	0.00	0.01	272.19	1.45	354.80
	28	5.13	5.13	0.00	0.01	284.38	1.44	349.76
	29	4.75	4.09	0.00	0.01	296.57	1.44	345.61
	30	4.05	2.88	0.00	0.01	308.75	1.44	342.42
	31	+3.05	+1.55	0.00	−0.01	320.93	−1.43	340.15
	32	+1.83	+0.18	0.00	−0.01	333.10	−1.43	338.74

ILLUMINATED DISK OF MERCURY, 1913.

FOR WASHINGTON MEAN NOON.

Date.		*k*	*i*	*θ*	*L*	Stellar Mag.	Date.		*k*	*i*	*θ*	*L*	Stellar Mag.
			°	°						°	°		
Jan.	1	0.728	63	188	39.4	−0.2	July	5	0.450	96	15	32.9	+0.6
	6	0.803	53	184	33.7	0.2		10	0.367	105	18	30.7	0.8
	11	0.857	44	179	29.7	0.2		15	0.281	116	22	27.7	1.1
	16	0.896	38	174	27.2	0.3		20	0.192	128	26	22.7	1.4
	21	0.927	31	168	26.0	0.3		25	0.106	142	32	14.9	1.9
	26	0.952	25	162	25.9	−0.5		30	0.037	158	47	6.0	+2.5
	31	0.971	19	154	26.9	0.6	Aug.	4	0.011	168	110	1.9	2.9
Feb.	5	0.987	13	143	29.2	0.8		9	0.047	155	169	8.3	2.3
	10	0.999	6	111	33.2	1.1		14	0.152	134	183	24.4	1.4
	15	0.998	7	20	39.5	1.2		19	0.316	112	190	44.4	+0.6
	20	0.974	19	351	48.5	−1.2		24	0.517	88	196	61.4	−0.2
	25	0.914	34	341	59.6	1.2		29	0.717	64	202	69.3	0.8
Mar.	2	0.792	54	336	69.2	1.0	Sept.	3	0.872	42	208	65.7	1.1
	7	0.609	77	333	69.9	−0.5		8	0.959	23	216	55.6	1.3
	12	0.390	103	330	56.1	+0.2		13	0.994	9	236	45.3	1.4
	17	0.194	128	326	33.2	+1.0		18	0.997	6	345	37.1	−1.2
	22	0.059	152	316	11.3	2.0		23	0.985	14	14	31.9	0.9
	27	0.005	172	262	1.0	3.0		28	0.965	22	20	28.5	0.6
Apr.	1	0.031	160	171	5.6	2.5	Oct.	3	0.940	28	22	26.7	0.4
	6	0.109	141	159	16.3	1.8		8	0.911	35	23	26.0	0.3
	11	0.206	126	155	25.0	+1.3		13	0.877	41	23	26.6	−0.2
	16	0.301	113	153	29.6	1.0		18	0.836	48	22	28.2	0.1
	21	0.388	103	152	31.7	0.8		23	0.784	55	21	31.1	−0.1
	26	0.470	93	151	32.9	0.6		28	0.714	65	20	35.4	0.0
May	1	0.547	85	151	34.1	0.4	Nov.	2	0.620	76	18	40.9	0.0
	6	0.622	76	152	36.1	+0.2		7	0.488	91	16	45.8	+0.2
	11	0.702	66	153	39.5	−0.1		12	0.312	112	15	43.7	0.6
	16	0.788	55	155	44.8	0.4		17	0.115	140	15	23.5	1.4
	21	0.876	41	158	52.2	0.9		22	0.001	176	349	0.4	3.0
	26	0.955	25	163	60.7	1.4		27	0.086	146	205	19.6	1.6
	31	0.998	5	186	66.8	−1.9	Dec.	2	0.303	113	203	49.2	+0.4
June	5	0.981	16	340	66.3	1.6		7	0.516	88	201	55.1	−0.1
	10	0.910	35	350	59.6	1.2		12	0.672	70	198	48.5	0.3
	15	0.813	51	357	51.1	0.7		17	0.778	56	194	40.4	0.3
	20	0.713	65	3	44.0	−0.2		22	0.850	46	190	34.1	0.3
	25	0.620	76	7	38.9	+0.1		27	0.898	37	185	29.6	−0.4
	30	0.535	86	11	35.5	+0.4		32	0.932	30	180	26.9	−0.4

NOTATION.

k = the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.

i = the angle between the Sun and Earth, as seen from the planet.

θ = the angle which the line joining the cusps, or extremities of the illuminated portion, makes with the meridian.

L = the brilliancy of the disk. The unit of *L* is the amount of light received by an eye from a circular disk with the same albedo as the planet, subtending an angular radius of one second of arc, situated at distance unity from the Sun, and illuminated by the latter as the mean disk of the planet is illuminated.

The magnitudes of the planet have been computed from formulæ given in the Potsdam Observations, vol. 8, page 366.

ILLUMINATED DISK OF VENUS, 1913.

FOR WASHINGTON MEAN NOON.

Date.	k	i	θ	L	Stellar Mag.	Date.	k	i	θ	L	Stellar Mag.
		°	°					°	°		
Jan. 1	0.692	67.5	342.5	96.7	-3.7	July 5	0.506	89.3	163.9	135.0	-3.9
6	0.674	69.7	341.0	101.3	3.7	10	0.533	86.3	165.7	127.6	3.9
11	0.655	71.9	339.7	106.3	3.8	15	0.558	83.4	167.6	120.7	3.8
16	0.636	74.2	338.6	111.7	3.8	20	0.582	80.7	169.8	114.4	3.8
21	0.616	76.6	337.7	117.5	3.8	25	0.605	78.0	172.1	108.7	3.8
26	0.595	79.1	337.0	123.9	-3.9	30	0.626	75.4	174.5	103.5	-3.7
31	0.573	81.7	336.4	130.9	3.9	Aug. 4	0.647	72.9	177.0	98.8	3.7
Feb. 5	0.549	84.4	336.0	138.4	4.0	9	0.667	70.5	179.6	94.5	3.7
10	0.524	87.3	335.7	146.4	4.0	14	0.686	68.1	182.2	90.6	3.6
15	0.497	90.4	335.5	154.9	4.1	19	0.705	65.8	184.9	87.0	3.6
20	0.468	93.6	335.4	163.9	-4.1	24	0.723	63.5	187.5	83.8	-3.6
25	0.438	97.1	335.3	173.3	4.2	29	0.740	61.3	190.1	80.8	3.5
Mar. 2	0.406	100.9	335.2	182.4	4.2	Sept. 3	0.757	59.1	192.6	78.1	3.5
7	0.371	105.0	335.1	190.8	4.2	8	0.773	56.9	194.9	75.6	3.5
12	0.334	109.4	334.9	198.2	4.3	13	0.789	54.8	197.1	73.2	3.5
17	0.294	114.4	334.5	202.3	-4.3	18	0.804	52.7	199.1	71.1	-3.5
22	0.251	119.9	333.7	201.3	4.3	23	0.818	50.6	200.9	69.2	3.4
27	0.205	126.1	332.5	192.9	4.3	28	0.832	48.5	202.5	67.3	3.4
Apr. 1	0.158	133.2	330.5	173.5	4.2	Oct. 3	0.845	46.4	203.8	65.5	3.4
6	0.111	141.0	327.5	141.3	4.1	8	0.857	44.4	204.9	64.0	3.4
11	0.068	149.7	322.6	97.9	-3.8	13	0.869	42.4	205.7	62.6	-3.4
16	0.032	159.3	313.7	51.5	3.6	18	0.881	40.4	206.2	61.2	3.4
21	0.011	167.9	296.9	18.9	3.2	23	0.892	38.4	206.5	59.9	3.4
26	0.005	171.6	223.6	9.1	3.0	28	0.902	36.5	206.5	58.7	3.4
May 1	0.019	164.2	181.4	30.9	3.4	Nov. 2	0.912	34.6	206.2	57.6	3.4
6	0.048	154.7	168.6	71.5	-3.6	7	0.921	32.7	205.7	56.5	-3.4
11	0.088	145.6	163.1	114.9	3.9	12	0.929	30.8	204.8	55.5	3.4
16	0.133	137.3	160.2	150.0	4.1	17	0.937	29.0	203.6	54.6	3.4
21	0.179	129.9	158.6	172.3	4.2	22	0.945	27.2	202.1	53.7	3.4
26	0.225	123.4	157.9	183.5	4.2	27	0.952	25.4	200.3	52.9	3.4
31	0.269	117.5	157.6	186.1	-4.2	Dec. 2	0.958	23.6	198.2	52.1	-3.4
June 5	0.310	112.3	157.7	183.1	4.2	7	0.964	21.8	195.8	51.4	3.4
10	0.349	107.6	158.1	177.1	4.2	12	0.970	20.1	193.1	50.8	3.4
15	0.384	103.4	158.8	168.9	4.1	17	0.975	18.4	190.1	50.2	3.4
20	0.418	99.5	159.8	160.3	4.1	22	0.979	16.7	186.8	49.6	3.4
25	0.449	95.9	160.9	151.5	-4.0	27	0.983	15.0	183.3	49.1	-3.4
30	0.478	92.5	162.3	143.0	-4.0	32	0.986	13.4	179.6	48.7	-3.4

NOTATION.

k=the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.

i=the angle between the Sun and Earth, as seen from the planet.

θ=the angle which the line joining the cusps, or extremities of the illuminated portion, makes with the meridian.

L=the brilliancy of the disk. The unit of L is the amount of light received by an eye from a circular disk with the same albedo as the planet, subtending an angular radius of one second of arc, situated at distance unity from the Sun, and illuminated by the latter as the mean disk of the planet is illuminated.

The magnitudes of the planet have been computed from formulæ given in the Potsdam Observations, vol. 8, page 366.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF MARS.

WASHINGTON MEAN TIME.

Noon.		Light-Time.	Stellar Magnitude.	P	$A_{\oplus}+180°$	$D_{\oplus}$	$A_{\odot}-A_{\oplus}$	$D_{\odot}$	☉♂
		m		°	°	°	°	°	°
July	1	13.49	+1.1	323.29	135.19	−16.47	−40.33	−23.90	274.44
	3	13.41	1.0	323.24	136.60	16.03	40.39	23.85	275.68
	5	13.34	1.0	323.21	138.01	15.58	40.44	23.79	276.92
	7	13.26	1.0	323.20	139.40	15.12	40.48	23.72	278.16
	9	13.18	1.0	323.22	140.79	14.65	40.52	23.64	279.39
	11	13.11	+1.0	323.26	142.16	−14.18	−40.55	−23.55	280.63
	13	13.03	1.0	323.33	143.52	13.70	40.57	23.44	281.86
	15	12.95	1.0	323.42	144.87	13.21	40.59	23.32	283.09
	17	12.87	1.0	323.53	146.20	12.72	40.60	23.19	284.31
	19	12.79	1.0	323.66	147.53	12.23	40.60	23.05	285.54
	21	12.71	+1.0	323.82	148.84	−11.73	−40.60	−22.90	286.76
	23	12.62	1.0	324.00	150.15	11.23	40.60	22.74	287.97
	25	12.54	1.0	324.19	151.45	10.73	40.59	22.57	289.19
	27	12.46	0.9	324.41	152.73	10.22	40.58	22.39	290.40
	29	12.37	0.9	324.65	154.00	9.71	40.56	22.20	291.61
	31	12.29	+0.9	324.90	155.27	− 9.20	−40.54	−22.00	292.82
Aug.	2	12.20	0.9	325.18	156.52	8.69	40.52	21.79	294.02
	4	12.12	0.9	325.48	157.76	8.18	40.49	21.57	295.21
	6	12.03	0.9	325.79	158.99	7.67	40.46	21.34	296.41
	8	11.94	0.9	326.12	160.21	7.16	40.43	21.10	297.60
	10	11.86	+0.9	326.46	161.42	− 6.64	−40.40	−20.86	298.79
	12	11.77	0.9	326.82	162.62	6.13	40.36	20.61	299.98
	14	11.68	0.8	327.19	163.81	5.62	40.32	20.35	301.16
	16	11.59	0.8	327.58	164.99	5.11	40.28	20.08	302.34
	18	11.50	0.8	327.98	166.16	4.61	40.23	19.81	303.52
	20	11.40	+0.8	328.40	167.32	− 4.10	−40.19	−19.53	304.69
	22	11.31	0.8	328.83	168.47	3.60	40.14	19.24	305.85
	24	11.21	0.8	329.26	169.62	3.10	40.09	18.94	307.02
	26	11.11	0.8	329.71	170.76	2.60	40.04	18.64	308.18
	28	11.02	0.8	330.17	171.88	2.11	39.99	18.33	309.33
	30	10.92	+0.7	330.64	172.99	− 1.63	−39.94	−18.01	310.49
Sept.	1	10.82	0.7	331.12	174.09	1.15	39.88	17.69	311.64
	3	10.73	0.7	331.60	175.18	0.67	39.82	17.36	312.78
	5	10.63	0.7	332.09	176.26	− 0.20	39.76	17.02	313.92
	7	10.53	0.7	332.59	177.33	+ 0.27	39.69	16.68	315.06
	9	10.42	+0.7	333.09	178.39	+ 0.73	−39.62	−16.34	316.19
	11	10.32	0.6	333.60	179.44	1.18	39.55	15.99	317.33
	13	10.22	0.6	334.11	180.48	1.63	39.48	15.64	318.46
	15	10.11	0.6	334.62	181.51	2.07	39.40	15.28	319.58
	17	10.01	0.6	335.14	182.52	2.50	39.32	14.92	320.70
	19	9.90	+0.6	335.66	183.52	+ 2.92	−39.23	−14.55	321.81
	21	9.80	0.5	336.18	184.51	3.34	39.14	14.18	322.92
	23	9.69	0.5	336.70	185.49	3.75	39.04	13.81	324.03
	25	9.58	0.5	337.22	186.45	4.15	38.94	13.43	325.13
	27	9.47	0.5	337.74	187.40	4.54	38.83	13.05	326.23
	29	9.36	+0.5	338.25	188.34	+ 4.92	−38.71	−12.67	327.33
Oct.	1	9.25	+0.4	338.76	189.26	+ 5.29	−38.58	−12.29	328.42

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF MARS.

WASHINGTON MEAN TIME.

Noon.		*k*	Diameter.	*i*	*q*	*Q*	Central Meridian.	Transit of Zero Meridian.	
								Of Date.	Of Intermediate Date.
			″	°	″	°	°	h m	h m
July	1	0.892	6.23	38.44	0.68	251.18	194.69	11 19.8	12 0.1
	3	0.891	6.26	38.63	0.69	251.57	175.08	12 40.4	13 20.7
	5	0.890	6.29	38.82	0.70	251.97	155.48	14 1.0	14 41.2
	7	0.889	6.33	39.00	0.71	252.38	135.88	15 21.5	16 1.8
	9	0.888	6.36	39.18	0.72	252.80	116.30	16 42.0	17 22.2
	11	0.887	6.40	39.36	0.73	253.23	96.73	18 2.5	18 42.7
	13	0.886	6.44	39.53	0.74	253.68	77.18	19 22.8	20 3.0
	15	0.885	6.48	39.70	0.75	254.13	57.63	20 43.2	21 23.4
	17	0.884	6.52	39.87	0.76	254.59	38.10	22 3.5	22 43.6
	19	0.883	6.56	40.03	0.77	255.06	18.58	23 23.7	. . . . .
	21	0.882	6.60	40.19	0.78	255.54	359.07	0 3.8	0 43.9
	23	0.881	6.64	40.35	0.79	256.02	339.57	1 24.0	2 4.1
	25	0.880	6.69	40.50	0.80	256.51	320.07	2 44.1	3 24.2
	27	0.879	6.73	40.65	0.81	257.01	300.59	4 4.2	4 44.2
	29	0.878	6.78	40.80	0.82	257.51	281.12	5 24.2	6 4.2
	31	0.878	6.83	40.94	0.84	258.01	261.67	6 44.2	7 24.2
Aug.	2	0.877	6.87	41.08	0.85	258.52	242.22	8 4.2	8 44.1
	4	0.876	6.92	41.21	0.86	259.03	222.78	9 24.1	10 4.0
	6	0.875	6.97	41.34	0.87	259.55	203.36	10 43.9	11 23.8
	8	0.875	7.02	41.46	0.88	260.07	183.95	12 3.7	12 43.6
	10	0.874	7.08	41.58	0.89	260.60	164.54	13 23.5	14 3.4
	12	0.873	7.13	41.69	0.90	261.13	145.14	14 43.2	15 23.1
	14	0.873	7.19	41.80	0.91	261.66	125.76	16 2.9	16 42.7
	16	0.872	7.24	41.90	0.93	262.19	106.38	17 22.5	18 2.3
	18	0.872	7.30	42.00	0.94	262.73	87.02	18 42.1	19 21.9
	20	0.871	7.36	42.09	0.95	263.26	67.66	20 1.6	20 41.4
	22	0.871	7.42	42.18	0.96	263.80	48.31	21 21.1	22 0.9
	24	0.870	7.48	42.26	0.97	264.33	28.98	22 40.6	23 20.3
	26	0.870	7.55	42.33	0.98	264.86	9.66	. . . . .	0 0.0
	28	0.869	7.61	42.40	0.99	265.39	350.35	0 39.7	1 19.4
	30	0.869	7.68	42.46	1.01	265.91	331.04	1 59.0	2 38.7
Sept.	1	0.869	7.75	42.51	1.02	266.43	311.74	3 18.3	3 58.0
	3	0.868	7.83	42.56	1.03	266.95	292.46	4 37.6	5 17.2
	5	0.868	7.90	42.60	1.04	267.47	273.19	5 56.8	6 36.4
	7	0.868	7.98	42.63	1.05	267.99	253.93	7 15.9	7 55.5
	9	0.868	8.05	42.65	1.06	268.50	234.68	8 35.0	9 14.6
	11	0.868	8.13	42.66	1.08	269.00	215.44	9 54.1	10 33.6
	13	0.868	8.22	42.66	1.09	269.50	196.21	11 13.1	11 52.6
	15	0.868	8.30	42.65	1.10	269.99	176.99	12 32.1	13 11.6
	17	0.868	8.39	42.64	1.11	270.47	157.79	13 51.0	14 30.4
	19	0.868	8.48	42.61	1.12	270.95	138.60	15 9.9	15 49.3
	21	0.868	8.58	42.57	1.13	271.42	119.42	16 28.7	17 8.0
	23	0.869	8.67	42.52	1.14	271.88	100.25	17 47.4	18 26.8
	25	0.869	8.77	42.46	1.15	272.33	81.09	19 6.1	19 45.4
	27	0.869	8.87	42.38	1.16	272.77	61.95	20 24.7	21 4.0
	29	0.870	8.97	42.29	1.17	273.20	42.83	21 43.3	22 22.6
Oct.	1	0.871	9.08	42.18	1.18	273.62	23.72	23 1.8	23 41.0

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF MARS.

WASHINGTON MEAN TIME.

Noon.		Light-Time.	Stellar Magnitude.	P	$A_\oplus+180°$	$D_\oplus$	$A_\odot-A_\oplus$	$D_\odot$	$\odot$♂
		m		°	°	°	°	°	°
Oct.	1	9.25	+0.4	338.76	189.26	+ 5.29	−38.58	−12.29	328.42
	3	9.13	0.4	339.27	190.16	5.65	38.44	11.90	329.51
	5	9.02	0.4	339.77	191.05	5.99	38.30	11.51	330.60
	7	8.91	0.4	340.26	191.92	6.33	38.14	11.12	331.68
	9	8.79	0.3	340.75	192.77	6.66	37.97	10.73	332.76
	11	8.68	+0.3	341.24	193.61	+ 6.97	−37.79	−10.33	333.83
	13	8.57	0.3	341.72	194.43	7.27	37.60	9.93	334.90
	15	8.45	0.2	342.19	195.22	7.56	37.39	9.53	335.97
	17	8.34	0.2	342.64	195.99	7.84	37.17	9.13	337.03
	19	8.22	0.2	343.08	196.74	8.10	36.93	8.73	338.09
	21	8.11	+0.2	343.51	197.47	+ 8.35	−36.67	− 8.33	339.14
	23	7.99	0.1	343.93	198.18	8.58	36.40	7.92	340.19
	25	7.87	0.1	344.34	198.86	8.80	36.11	7.52	341.24
	27	7.76	+0.1	344.73	199.51	9.01	35.79	7.11	342.29
	29	7.64	0.0	345.10	200.13	9.20	35.44	6.70	343.33
	31	7.53	0.0	345.45	200.72	+ 9.37	−35.07	− 6.29	344.37
Nov.	2	7.41	0.0	345.79	201.28	9.53	34.67	5.88	345.40
	4	7.30	−0.1	346.11	201.81	9.67	34.25	5.47	346.43
	6	7.19	0.1	346.41	202.31	9.79	33.80	5.07	347.46
	8	7.07	0.2	346.69	202.77	9.90	33.32	4.66	348.48
	10	6.96	−0.2	346.94	203.19	+ 9.98	−32.80	− 4.25	349.50
	12	6.85	0.2	347.17	203.57	10.05	32.25	3.84	350.52
	14	6.75	0.3	347.38	203.91	10.10	31.66	3.43	351.53
	16	6.64	0.3	347.56	204.21	10.13	31.04	3.02	352.54
	18	6.54	0.4	347.71	204.47	10.14	30.38	2.62	353.55
	20	6.43	−0.4	347.83	204.68	+10.13	−29.67	− 2.21	354.55
	22	6.33	0.5	347.93	204.85	10.10	28.91	1.80	355.55
	24	6.23	0.5	348.00	204.97	10.05	28.11	1.40	356.55
	26	6.13	0.6	348.03	205.03	9.97	27.27	1.00	357.54
	28	6.04	0.6	348.02	205.04	9.88	26.38	0.60	358.53
	30	5.95	−0.6	347.98	205.00	+ 9.76	−25.44	− 0.20	359.52
Dec.	2	5.86	0.7	347.91	204.91	9.62	24.45	+ 0.20	0.51
	4	5.78	0.7	347.82	204.77	9.45	23.41	0.60	1.49
	6	5.70	0.8	347.69	204.57	9.27	22.32	1.00	2.47
	8	5.63	0.8	347.52	204.32	9.06	21.18	1.40	3.45
	10	5.56	−0.9	347.32	204.03	+ 8.84	−19.99	+ 1.79	4.42
	12	5.50	0.9	347.09	203.68	8.59	18.75	2.19	5.39
	14	5.44	1.0	346.83	203.28	8.33	17.47	2.58	6.36
	16	5.38	1.0	346.53	202.83	8.04	16.14	2.97	7.32
	18	5.33	1.0	346.21	202.34	7.74	14.76	3.36	8.28
	20	5.29	−1.1	345.86	201.80	+ 7.42	−13.34	+ 3.74	9.24
	22	5.25	1.1	345.49	201.23	7.09	11.89	4.13	10.20
	24	5.22	1.1	345.09	200.62	6.75	10.40	4.51	11.15
	26	5.20	1.2	344.68	199.97	6.40	8.88	4.89	12.10
	28	5.19	1.2	344.25	199.30	6.04	7.34	5.27	13.05
	30	5.18	−1.2	343.81	198.61	+ 5.68	− 5.78	+ 5.65	14.00
	32	5.17	−1.2	343.36	197.91	+ 5.31	− 4.20	+ 6.02	14.94

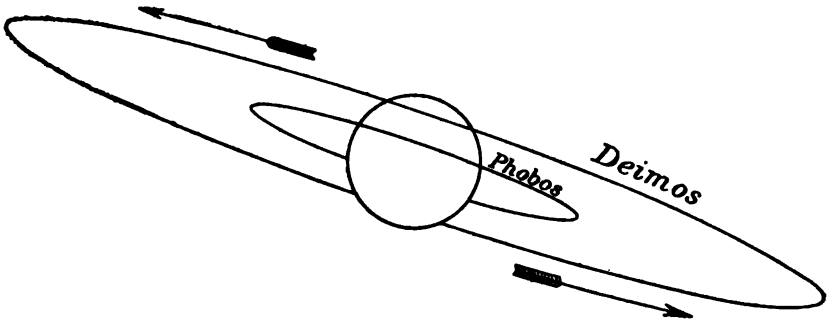
EPHEMERIS FOR PHYSICAL OBSERVATIONS OF MARS.

WASHINGTON MEAN TIME.

Noon.		*k*	Diameter.	*i*	*q*	*Q*	Central Meridian.	Transit of Zero Meridian. Of Date.	Transit of Zero Meridian. Of Intermediate Date.
			″	°	″	°	°	h m	h m
Oct.	1	0.871	9.08	42.18	1.18	273.62	23.72	23 1.8	23 41.0
	3	0.871	9.19	42.06	1.18	274.03	4.63	. . . . .	0 20.2
	5	0.872	9.30	41.93	1.19	274.43	345.55	0 59.4	1 38.5
	7	0.873	9.42	41.78	1.20	274.82	326.49	2 17.7	2 56.8
	9	0.874	9.54	41.61	1.20	275.19	307.45	3 35.9	4 15.0
	11	0.875	9.67	41.42	1.21	275.55	288.43	4 54.0	5 33.1
	13	0.876	9.80	41.21	1.21	275.90	269.42	6 12.1	6 51.1
	15	0.877	9.93	40.98	1.22	276.23	250.44	7 30.1	8 9.0
	17	0.879	10.07	40.73	1.22	276.55	231.48	8 48.0	9 26.9
	19	0.880	10.21	40.46	1.22	276.85	212.54	10 5.8	10 44.6
	21	0.882	10.35	40.16	1.22	277.13	193.62	11 23.4	12 2.2
	23	0.884	10.50	39.84	1.22	277.40	174.73	12 41.0	13 19.8
	25	0.886	10.66	39.50	1.22	277.65	155.86	13 58.5	14 37.2
	27	0.888	10.82	39.13	1.21	277.88	137.02	15 15.8	15 54.4
	29	0.890	10.98	38.72	1.21	278.10	118.21	16 33.0	17 11.6
	31	0.892	11.15	38.28	1.20	278.30	99.44	17 50.1	18 28.6
Nov.	2	0.895	11.32	37.82	1.19	278.47	80.69	19 7.1	19 45.5
	4	0.898	11.50	37.34	1.18	278.62	61.97	20 23.9	21 2.2
	6	0.900	11.68	36.82	1.16	278.75	43.29	21 40.5	22 18.8
	8	0.903	11.86	36.25	1.15	278.86	24.64	22 57.0	23 35.2
	10	0.906	12.05	35.64	1.13	278.94	6.03	. . . . .	0 13.4
	12	0.910	12.24	34.99	1.10	279.00	347.46	0 51.5	1 29.5
	14	0.913	12.44	34.31	1.08	279.03	328.93	2 7.6	2 45.6
	16	0.917	12.64	33.59	1.06	279.02	310.44	3 23.5	4 1.4
	18	0.920	12.84	32.83	1.03	278.98	291.99	4 39.2	5 17.0
	20	0.924	13.05	32.02	0.99	278.91	273.59	5 54.7	6 32.4
	22	0.928	13.26	31.15	0.96	278.81	255.23	7 10.0	7 47.6
	24	0.932	13.47	30.24	0.92	278.67	236.92	8 25.1	9 2.6
	26	0.936	13.68	29.28	0.87	278.49	218.66	9 40.0	10 17.4
	28	0.940	13.89	28.27	0.83	278.26	200.46	10 54.7	11 32.0
	30	0.945	14.10	27.21	0.78	277.98	182.30	12 9.2	12 46.3
Dec.	2	0.949	14.31	26.09	0.73	277.65	164.20	13 23.4	14 0.4
	4	0.953	14.51	24.92	0.67	277.27	146.14	14 37.4	15 14.3
	6	0.958	14.71	23.70	0.62	276.83	128.14	15 51.2	16 28.0
	8	0.962	14.91	22.42	0.56	276.30	110.19	17 4.7	17 41.4
	10	0.966	15.10	21.10	0.51	275.68	92.29	18 18.1	18 54.7
	12	0.971	15.27	19.73	0.45	274.97	74.44	19 31.2	20 7.7
	14	0.975	15.44	18.31	0.39	274.14	56.64	20 44.1	21 20.5
	16	0.979	15.60	16.84	0.33	273.17	38.88	21 56.9	22 33.2
	18	0.982	15.74	15.33	0.28	272.01	21.17	23 9.4	23 45.6
	20	0.986	15.87	13.78	0.23	270.63	3.50	. . . . .	0 21.8
	22	0.989	15.98	12.20	0.18	268.93	345.87	0 57.9	1 34.0
	24	0.991	16.07	10.59	0.14	266.76	328.28	2 10.1	2 46.1
	26	0.994	16.14	8.97	0.10	263.90	310.71	3 22.1	3 58.1
	28	0.996	16.19	7.35	0.07	259.89	293.16	4 34.0	5 9.9
	30	0.998	16.22	5.75	0.04	253.82	275.64	5 45.8	6 21.7
	32	0.999	16.23	4.24	0.02	243.49	258.13	6 57.6	7 33.5

APPARENT ORBITS OF THE SATELLITES OF MARS, AT DATE OF OPPOSITION, JANUARY 5, 1914, AS SEEN IN AN INVERTING TELESCOPE.

South



North

Phobos.			Deimos.		
Date.	Position Angle of Apsis.	Distance at Apsis.	Date.	Position Angle of Apsis.	Distance at Apsis.
d	°	″	d	°	″
Nov. 22	256.7	17.0	Nov. 22	256.7	42.7
Dec. 12	255.8	19.6	Dec. 12	255.8	49.2
32	251.9	20.8	32	251.9	52.2

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

Phobos.												Deimos.							
	d	h			d	h			d	h			d	h			d	h	
Nov.	11	22.4	E.	Nov.	28	16.2	W.	Dec.	15	10.1	E.	Nov.	8	15.2	E.	Dec.	7	1.0	W.
	13	1.2	W.		29	19.0	E.		16	12.8	W.		10	12.6	W.		8	22.4	E.
	14	4.0	E.		30	21.8	W.		17	15.6	E.		12	10.1	E.		10	19.8	W.
	15	6.8	W.	Dec.	2	0.6	E.		18	18.4	W.		14	7.5	W.		12	17.2	E.
	16	9.6	E.		3	3.4	W.		19	21.1	E.		16	5.0	E.		14	14.7	W.
	17	12.4	W.		4	6.2	E.		20	23.9	W.		18	2.5	W.		16	12.0	E.
	18	15.1	E.		5	8.9	W.		22	2.7	E.		20	0.0	E.		18	9.5	W.
	19	17.9	W.		6	11.7	E.		23	5.4	W.		21	21.4	W.		20	6.9	E.
	20	20.7	E.		7	14.5	W.		24	8.2	E.		23	18.9	E.		22	4.3	W.
	21	23.5	W.		8	17.3	E.		25	11.0	W.		25	16.3	W.		24	1.7	E.
	23	2.3	E.		9	20.1	W.		26	13.8	E.		27	13.8	E.		25	23.1	W.
	24	5.1	W.		10	22.9	E.		27	16.6	W.		29	11.2	W.		27	20.4	E.
	25	7.8	E.		12	1.7	W.		28	19.4	E.	Dec.	1	8.7	E.		29	17.9	W.
	26	10.6	W.		13	4.5	E.		29	22.2	W.		3	6.1	W.		31	15.2	E.
	27	13.4	E.		14	7.3	W.		31	0.9	E.		5	3.5	E.		33	12.7	W.

For Phobos every seventh eastern and western elongation is given, and for Deimos every third; the intermediate ones may be found by adding multiples of the period of the satellite.

Sidereal period of Phobos, $7^h\ 39^m\ 13^s.85$. Sidereal period of Deimos, $30^h\ 17^m\ 54^s.86$.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER.

WASHINGTON MEAN TIME.

Noon.		Light-Time.	Stellar Magnitude.	P	$A_{\oplus}+180^\circ$	$D_{\oplus}$	$A_{\odot}+180^\circ$	$D_{\odot}$
		m		°	°	°	°	°
Jan.	25	50.51	−1.4	356.78	139.46	−2.09	134.06	−2.21
Feb.	1	49.98	1.4	356.10	140.93	2.05	134.63	2.18
	8	49.38	1.5	355.44	142.35	2.02	135.20	2.16
	15	48.72	1.5	354.82	143.72	1.98	135.78	2.14
	22	48.00	1.5	354.23	145.02	1.94	136.35	2.12
Mar.	1	47.22	−1.5	353.68	146.23	−1.91	136.92	−2.10
	8	46.39	1.6	353.17	147.36	1.87	137.50	2.08
	15	45.52	1.6	352.70	148.40	1.84	138.07	2.05
	22	44.62	1.7	352.28	149.34	1.81	138.64	2.03
	29	43.70	1.7	351.92	150.16	1.78	139.22	2.00
Apr.	5	42.77	−1.8	351.62	150.85	−1.75	139.80	−1.98
	12	41.84	1.8	351.37	151.41	1.72	140.37	1.96
	19	40.91	1.9	351.19	151.83	1.70	140.95	1.94
	26	40.00	1.9	351.07	152.10	1.68	141.53	1.91
May	3	39.13	2.0	351.01	152.22	1.66	142.10	1.89
	10	38.31	−2.0	351.02	152.19	−1.65	142.68	−1.86
	17	37.54	2.1	351.10	152.01	1.64	143.26	1.84
	24	36.84	2.1	351.25	151.68	1.64	143.84	1.81
	31	36.22	2.2	351.46	151.20	1.63	144.42	1.79
June	7	35.70	2.2	351.72	150.59	1.63	145.00	1.76
	14	35.28	−2.2	352.03	149.88	−1.63	145.59	−1.74
	21	34.96	2.2	352.39	149.08	1.63	146.17	1.71
	28	34.76	2.2	352.77	148.22	1.64	146.75	1.68
July	5	34.69	2.2	353.17	147.32	1.64	147.34	1.66
	12	34.73	2.2	353.57	146.42	1.64	147.92	1.63
	19	34.89	−2.2	353.96	145.56	−1.64	148.50	−1.60
	26	35.16	2.2	354.33	144.76	1.64	149.09	1.58
Aug.	2	35.54	2.2	354.66	144.04	1.65	149.67	1.55
	9	36.03	2.2	354.94	143.43	1.64	150.26	1.52
	16	36.61	2.1	355.16	142.95	1.64	150.84	1.50
	23	37.27	−2.1	355.31	142.61	−1.64	151.43	−1.47
	30	38.00	2.1	355.40	142.42	1.63	152.02	1.44
Sept.	6	38.79	2.0	355.41	142.39	1.62	152.61	1.41
	13	39.62	2.0	355.35	142.51	1.61	153.19	1.39
	20	40.49	1.9	355.22	142.79	1.59	153.78	1.36
	27	41.37	−1.9	355.02	143.22	−1.58	154.37	−1.33
Oct.	4	42.26	1.8	354.76	143.79	1.56	154.96	1.30
	11	43.15	1.8	354.44	144.50	1.53	155.56	1.27
	18	44.02	1.8	354.06	145.33	1.51	156.15	1.24
	25	44.88	1.7	353.63	146.28	1.48	156.74	1.21
Nov.	1	45.71	−1.7	353.16	147.34	−1.45	157.33	−1.18
	8	46.49	1.6	352.64	148.49	1.42	157.92	1.15
	15	47.22	1.6	352.08	149.73	1.38	158.52	1.12
	22	47.90	1.6	351.50	151.05	1.34	159.11	1.09
	29	48.53	1.5	350.89	152.45	1.30	159.71	1.06
Dec.	6	49.08	−1.5	350.26	153.90	−1.26	160.30	−1.03
	13	49.55	−1.5	349.62	155.41	−1.21	160.90	−1.00

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER.

WASHINGTON MEAN TIME.

Noon.		Equatorial Diameter.	Excess of Equat. Diameter over Polar.	*i*	*q*	*Q*	Central Meridian.		Correction for Phase.
							Equatorial Region.	Great Red Spot.	
		″	″	°	″	°	°	°	°
Jan.	25	32.98	2.00	5.40	0.07	268.16	205.35	157.29	+0.13
Feb.	1	33.32	2.02	6.30	0.10	267.43	229.50	128.08	0.17
	8	33.72	2.04	7.15	0.13	266.76	253.74	98.96	0.22
	15	34.18	2.07	7.94	0.16	266.14	278.07	69.93	0.27
	22	34.69	2.10	8.66	0.20	265.55	302.51	41.00	0.33
Mar.	1	35.27	2.14	9.31	0.23	265.01	327.07	12.20	+0.38
	8	35.90	2.18	9.87	0.27	264.51	351.75	343.52	0.42
	15	36.58	2.22	10.33	0.30	264.06	16.54	314.94	0.46
	22	37.32	2.26	10.69	0.32	263.65	41.45	286.48	0.49
	29	38.10	2.31	10.93	0.35	263.29	66.49	258.15	0.52
Apr.	5	38.93	2.36	11.05	0.36	262.99	91.67	229.97	+0.53
	12	39.80	2.41	11.03	0.37	262.76	116.98	201.91	0.53
	19	40.70	2.47	10.87	0.37	262.59	142.43	173.99	0.51
	26	41.63	2.52	10.57	0.35	262.47	168.01	146.20	0.49
May	3	42.56	2.58	10.12	0.33	262.42	193.72	118.55	0.45
	10	43.47	2.63	9.51	0.30	262.43	219.55	91.02	+0.39
	17	44.36	2.69	8.74	0.26	262.51	245.50	63.60	0.33
	24	45.20	2.74	7.82	0.21	262.66	271.55	36.29	0.27
	31	45.97	2.79	6.77	0.16	262.88	297.71	9.09	0.20
June	7	46.65	2.83	5.59	0.11	263.15	323.93	341.95	0.14
	14	47.21	2.86	4.29	0.07	263.49	350.21	314.86	+0.08
	21	47.63	2.89	2.91	0.03	263.93	16.50	287.79	0.04
	28	47.90	2.90	1.46	0.01	264.73	42.78	260.71	+0.01
July	5	48.01	2.91	0.02	0.00	30.03	69.02	233.59	0.00
	12	47.95	2.90	1.49	0.01	83.90	95.19	206.39	−0.01
	19	47.73	2.89	2.94	0.03	84.68	121.26	179.10	−0.04
	26	47.36	2.87	4.33	0.07	85.15	147.20	151.68	0.08
Aug.	2	46.85	2.84	5.63	0.11	85.54	172.99	124.12	0.14
	9	46.22	2.80	6.82	0.16	85.85	198.60	96.37	0.20
	16	45.49	2.76	7.89	0.21	86.09	224.02	68.43	0.27
	23	44.68	2.71	8.82	0.26	86.27	249.26	40.31	−0.34
	30	43.82	2.66	9.60	0.31	86.38	274.31	12.00	0.40
Sept.	6	42.93	2.60	10.22	0.34	86.42	299.16	343.49	0.45
	13	42.03	2.55	10.68	0.36	86.40	323.83	314.81	0.50
	20	41.14	2.49	10.99	0.38	86.32	348.32	285.95	0.53
	27	40.26	2.44	11.16	0.38	86.16	12.65	256.92	−0.54
Oct.	4	39.41	2.39	11.18	0.37	85.94	36.84	227.75	0.54
	11	38.60	2.34	11.06	0.36	85.66	60.90	198.45	0.53
	18	37.83	2.29	10.82	0.34	85.34	84.83	169.03	0.51
	25	37.10	2.25	10.46	0.31	84.97	108.65	139.50	0.48
Nov.	1	36.43	2.21	10.00	0.28	84.56	132.38	109.87	−0.43
	8	35.82	2.17	9.44	0.24	84.11	156.06	80.19	0.39
	15	35.26	2.14	8.79	0.21	83.64	179.68	50.45	0.34
	22	34.76	2.11	8.06	0.17	83.16	203.24	20.65	0.28
	29	34.32	2.08	7.26	0.14	82.66	226.76	350.82	0.23
Dec.	6	33.94	2.06	6.40	0.11	82.17	250.27	320.96	−0.18
	13	33.61	2.04	5.49	0.08	81.68	273.78	291.11	−0.13

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER, EQUATORIAL REGION.

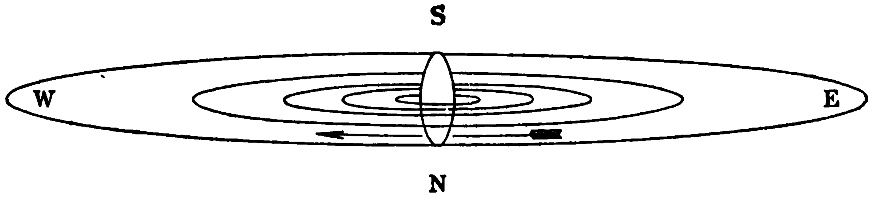
WASHINGTON MEAN TIME.

	Transit of Zero Meridian.	Interval between Successive Transits.		Transit of Zero Meridian.	Interval between Successive Transits.		Transit of Zero Meridian.	Interval between Successive Transits.
	d h m	h m		d h m	h m		d h m	h m
Jan.	26 19 35.96	9 50.61	May	13 10 33.29	9 50.44	Aug.	28 1 8.55	9 50.53
	28 20 49.00			15 11 45.50			30 2 21.23	
	30 22 2.02			17 12 57.69		Sept.	1 3 33.94	
Feb.	1 23 15.03			19 14 9.87			3 4 46.67	
	4 0 28.03			21 15 22.04			5 5 59.43	
	6 1 41.01	9 50.59		23 16 34.19	9 50.43		7 7 12.22	9 50.56
	8 2 53.98			25 17 46.33			9 8 25.03	
	10 4 6.93			27 18 58.45			11 9 37.86	
	12 5 19.87			29 20 10.57			13 10 50.72	
	14 6 32.79			31 21 22.67			15 12 3.60	
	16 7 45.70	9 50.58	June	2 22 34.77	9 50.42		17 13 16.51	9 50.58
	18 8 58.59			4 23 46.85			19 14 29.43	
	20 10 11.47			7 0 58.92			21 15 42.37	
	22 11 24.34			9 2 10.99			23 16 55.34	
	24 12 37.19			11 3 23.05			25 18 8.32	
	26 13 50.02	9 50.56		13 4 35.10	9 50.41		27 19 21.33	9 50.60
	28 15 2.84			15 5 47.15			29 20 34.34	
Mar.	2 16 15.64			17 6 59.20		Oct.	1 21 47.38	
	4 17 28.43			19 8 11.24			3 23 0.44	
	6 18 41.20			21 9 23.28			6 0 13.51	
	8 19 53.95	9 50.55		23 10 35.32	9 50.41		8 1 26.60	9 50.62
	10 21 6.69			25 11 47.36			10 2 39.71	
	12 22 19.41			27 12 59.41			12 3 52.84	
	14 23 32.12			29 14 11.45			14 5 5.98	
	17 0 44.81		July	1 15 23.50			16 6 19.13	
	19 1 57.49	9 50.53		3 16 35.56	9 50.41		18 7 32.30	9 50.64
	21 3 10.15			5 17 47.63			20 8 45.48	
	23 4 22.79			7 18 59.71			22 9 58.67	
	25 5 35.41			9 20 11.80			24 11 11.88	
	27 6 48.01			11 21 23.91			26 12 25.10	
	29 8 0.60	9 50.52		13 22 36.03	9 50.43		28 13 38.32	9 50.65
	31 9 13.17			15 23 48.17			30 14 51.56	
Apr.	2 10 25.72			18 1 0.32		Nov.	1 16 4.81	
	4 11 38.26			20 2 12.50			3 17 18.06	
	6 12 50.78			22 3 24.70			5 18 31.32	
	8 14 3.28	9 50.50		24 4 36.91	9 50.45		7 19 44.58	9 50.65
	10 15 15.76			26 5 49.15			9 20 57.86	
	12 16 28.23			28 7 1.42			11 22 11.14	
	14 17 40.68			30 8 13.71			13 23 24.43	
	16 18 53.12		Aug.	1 9 26.03			16 0 37.73	
	18 20 5.54	9 50.48		3 10 38.37	9 50.47		18 1 51.04	9 50.66
	20 21 17.94			5 11 50.74			20 3 4.35	
	22 22 30.33			7 13 3.14			22 4 17.67	
	24 23 42.69			9 14 15.56			24 5 31.00	
	27 0 55.05			11 15 28.01			26 6 44.32	
	29 2 7.38	9 50.46		13 16 40.48	9 50.50		28 7 57.66	9 50.67
May	1 3 19.70			15 17 52.99			30 9 10.99	
	3 4 32.00			17 19 5.52		Dec.	2 10 24.33	
	5 5 44.29			19 20 18.07			4 11 37.66	
	7 6 56.56			21 21 30.65			6 12 51.00	
	9 8 8.82	9 50.45		23 22 43.26	9 50.52		8 14 4.33	9 50.67
	11 9 21.06			25 23 55.89			10 15 17.67	

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER, GREAT RED SPOT.

WASHINGTON MEAN TIME.

Transit of Great Red Spot.				Interval between Successive Transits.		Transit of Great Red Spot.				Interval between Successive Transits.		Transit of Great Red Spot.				Interval between Successive Transits.	
	d	h	m	h	m		d	h	m	h	m		d	h	m	h	m
Jan.	25	5	35.26	9	55.78	May	12	18	58.09	9	55.62	Aug.	28	7	57.95	9	55.71
	27	7	14.18				14	20	36.17				30	9	36.51		
	29	8	53.08				16	22	14.23			Sept.	1	11	15.09		
	31	10	31.97				18	23	52.28				3	12	53.70		
Feb.	2	12	10.85				21	1	30.31				5	14	32.34		
	4	13	49.71	9	55.77		23	3	8.32	9	55.60		7	16	11.00	9	55.73
	6	15	28.56				25	4	46.31				9	17	49.68		
	8	17	7.40				27	6	24.29				11	19	28.38		
	10	18	46.23				29	8	2.26				13	21	7.11		
	12	20	25.05				31	9	40.22				15	22	45.86		
	14	22	3.85	9	55.76	June	2	11	18.17	9	55.59		18	0	24.63	9	55.76
	16	23	42.63				4	12	56.11				20	2	3.43		
	19	1	21.38				6	14	34.04				22	3	42.25		
	21	3	0.12				8	16	11.96				24	5	21.08		
	23	4	38.83				10	17	49.88				26	6	59.93		
	25	6	17.53	9	55.74		12	19	27.80	9	55.58		28	8	38.81	9	55.78
	27	7	56.23				14	21	5.71				30	10	17.70		
Mar.	1	9	34.92				16	22	43.61			Oct.	2	11	56.61		
	3	11	13.59				19	0	21.51				4	13	35.55		
	5	12	52.24				21	1	59.40				6	15	14.50		
	7	14	30.88	9	55.72		23	3	37.29	9	55.58		8	16	53.47	9	55.80
	9	16	9.49				25	5	15.19				10	18	32.45		
	11	17	48.08				27	6	53.09				12	20	11.44		
	13	19	26.66				29	8	30.99				14	21	50.45		
	15	21	5.23			July	1	10	8.89				16	23	29.47		
	17	22	43.79	9	55.71		3	11	46.80	9	55.58		19	1	8.52	9	55.81
	20	0	22.33				5	13	24.72				21	2	47.58		
	22	2	0.85				7	15	2.65				23	4	26.66		
	24	3	39.35				9	16	40.60				25	6	5.74		
	26	5	17.83				11	18	18.56				27	7	44.83		
	28	6	56.29	9	55.69		13	19	56.53	9	55.60		29	9	23.93	9	55.82
	30	8	34.73				15	21	34.52				31	11	3.04		
Apr.	1	10	13.15				17	23	12.53			Nov.	2	12	42.16		
	3	11	51.56				20	0	50.56				4	14	21.29		
	5	13	29.95				22	2	28.61				6	16	0.43		
	7	15	8.33	9	55.67		24	4	6.69	9	55.62		8	17	39.58	9	55.83
	9	16	46.69				26	5	44.80				10	19	18.74		
	11	18	25.03				28	7	22.93				12	20	57.91		
	13	20	3.36				30	9	1.08				14	22	37.07		
	15	21	41.67			Aug.	1	10	39.25				17	0	16.24		
	17	23	19.96	9	55.66		3	12	17.44	9	55.64		19	1	55.42	9	55.84
	20	0	58.23				5	13	55.66				21	3	34.61		
	22	2	36.48				7	15	33.91				23	5	13.81		
	24	4	14.72				9	17	12.20				25	6	53.01		
	26	5	52.94				11	18	50.51				27	8	32.22		
	28	7	31.14	9	55.64		13	20	28.85	9	55.67		29	10	11.42	9	55.84
	30	9	9.32				15	22	7.22			Dec.	1	11	50.63		
May	2	10	47.49				17	23	45.61				3	13	29.85		
	4	12	25.64				20	1	24.02				5	15	9.06		
	6	14	3.78				22	3	2.47				7	16	48.28		
	8	15	41.90	9	55.62		24	4	40.94	9	55.70		9	18	27.50	9	55.84
	10	17	20.00				26	6	19.43				11	20	6.71		



APPARENT ORBITS OF THE SATELLITES OF JUPITER AT DATE OF OPPOSITION, JULY 4, 1913, AS SEEN IN AN INVERTING TELESCOPE.

(*The vertical scale is three times the horizontal one.*)

In the above diagram the central vertical ellipse represents the disk of Jupiter, elongated three times in the vertical direction, and the inner ellipse represents the orbit of Satellite V. The object of the figure is to facilitate the identification of satellites in cases where the diagrams of configurations do not suffice. For example, if two satellites are seen together, a reference to the above figure will show which is the inner and which the outer one of the pair.

The ephemeris of the four outer satellites of Jupiter is given on pages 632–655, each month occupying two pages, which contain, respectively, the times of the phenomena and the diagrams of the configurations. The latter are given for each day, Jupiter being represented by a light disk, ○, in the center of the page, and the relative positions of the satellites at the Washington time stated above the diagrams being indicated by dots. The designation of each satellite is shown by a numeral placed to the right or left of the dot, according as the motion of the satellite at the instant in question is toward the east or toward the west, the motion being always toward the numeral. In constructing the diagrams the latitudes of the satellites are always considered zero, except where two or more of them chance to be at nearly the same distance from the planet, when they are placed one above the other, according to their apparent latitudes. If, at the epoch of any configuration, one or more satellites are projected on the disk of the planet, that phenomenon is indicated by a light disk ○, at the left-hand side of the page; and if any satellites are invisible on account of being occulted behind the disk of the planet, or eclipsed by its shadow, that circumstance is indicated by a dark disk, ●, at the right-hand side of the page. In both cases the annexed numerals serve to point out which satellites are thus rendered invisible.

The differential coordinates of the sixth and seventh satellites will be found on pages 630 and 631.

MEAN SYNODIC PERIODS OF THE SATELLITES.

	d	h	m	s		d		d	h	m	s		d
I.	1	18	28	35.945	=	1.769 860 48	V.	0	11	57	27.635	=	0.498 236 52
II.	3	13	17	53.735	=	3.554 094 16	VI.					=	266.00
III.	7	3	59	35.854	=	7.166 387 20	VII.					=	276.67
IV.	16	18	5	6.928	=	16.753 552 41							

SATELLITE V.

WASHINGTON MEAN TIME OF EVERY TWENTIETH GREATEST ELONGATION.

	d	h			d	h			d	h			d	h	
Apr.	20	12.4	E.	July	19	16.2	E.	Apr.	20	6.4	W.	July	19	10.2	W.
	30	11.5	E.		29	15.3	E.		30	17.5	W.		29	9.3	W.
May	10	10.6	E.	Aug.	8	14.4	E.	May	10	16.6	W	Aug.	8	8.4	W.
	20	9.7	E.		18	13.5	E.		20	15.7	W.		18	7.5	W.
	30	8.8	E.		28	12.6	E.		30	14.8	W.		28	6.6	W.
June	9	7.9	E.	Sept.	7	11.8	E.	June	9	13.9	W.	Sept.	7	17.7	W.
	19	7.0	E.		17	10.9	E.		19	12.9	W.		17	16.9	W.
	29	6.1	E.		27	10.1	E.		29	12.0	W.		27	16.1	W.
July	9	17.1	E.	Oct.	7	9.3	E.	July	9	11.1	W.	Oct.	7	15.2	W.

WASHINGTON MEAN TIME OF SUPERIOR GEOCENTRIC CONJUNCTION.

SATELLITE I.

	d	h	m		d	h	m		d	h	m		d	h	m
Jan.	18	12	28.9	Apr.	13	12	1.3	July	7	9	27.1	Sept.	30	7	9.5
	20	6	59.1		15	6	29.5		9	3	53.1	Oct.	2	1	38.3
	22	1	29.3		17	0	57.6		10	22	19.0		3	20	7.1
	23	19	59.5		18	19	25.7		12	16	45.0		5	14	36.0
	25	14	29.7		20	13	53.7		14	11	11.0		7	9	4.9
	27	8	59.9		22	8	21.7		16	5	37.0		9	3	33.9
	29	3	30.0		24	2	49.6		18	0	3.1		10	22	3.0
	30	22	0.1		25	21	17.3		19	18	29.2		12	16	32.1
Feb.	1	16	30.2		27	15	45.0		21	12	55.3		14	11	1.2
	3	11	0.3		29	10	12.7		23	7	21.5		16	5	30.4
	5	5	30.4	May	1	4	40.3		25	1	47.7		17	23	59.7
	7	0	0.3		2	23	7.8		26	20	13.9		19	18	29.0
	8	18	30.3		4	17	35.3		28	14	40.2		21	12	58.4
	10	13	0.2		6	12	2.7		30	9	6.5		23	7	27.8
	12	7	30.1		8	6	30.0	Aug.	1	3	32.9		25	1	57.2
	14	2	0.0		10	0	57.2		2	21	59.4		26	20	26.8
	15	20	29.9		11	19	24.4		4	16	25.9		28	14	56.4
	17	14	59.7		13	13	51.5		6	10	52.5		30	9	26.0
	19	9	29.4		15	8	18.6		8	5	19.1	Nov.	1	3	55.6
	21	3	59.1		17	2	45.5		9	23	45.8		2	22	25.3
	22	22	28.8		18	21	12.4		11	18	12.5		4	16	55.0
	24	16	58.5		20	15	39.3		13	12	39.3		6	11	24.8
	26	11	28.1		22	10	6.1		15	7	6.1		8	5	54.6
	28	5	57.7		24	4	32.8		17	1	33.1		10	0	24.5
Mar.	2	0	27.3		25	22	59.5		18	20	0.1		11	18	54.4
	3	18	56.8		27	17	26.1		20	14	27.2		13	13	24.3
	5	13	26.2		29	11	52.6		22	8	54.3		15	7	54.3
	7	7	55.6		31	6	19.1		24	3	21.5		17	2	24.3
	9	2	25.0	June	2	0	45.5		25	21	48.8		18	20	54.3
	10	20	54.3		3	19	11.9		27	16	16.2		20	15	24.4
	12	15	23.6		5	13	38.3		29	10	43.6		22	9	54.4
	14	9	52.8		7	8	4.6		31	5	11.1		24	4	24.5
	16	4	22.0		9	2	30.9	Sept.	1	23	38.7		25	22	54.6
	17	22	51.1		10	20	57.1		3	18	6.3		27	17	24.8
	19	17	20.2		12	15	23.3		5	12	34.0		29	11	55.0
	21	11	49.2		14	9	49.4		7	7	1.8	Dec.	1	6	25.2
	23	6	18.2		16	4	15.5		9	1	29.7		3	0	55.4
	25	0	47.1		17	22	41.6		10	19	57.6		4	19	25.6
	26	19	15.9		19	17	7.6		12	14	25.6		6	13	55.9
	28	13	44.7		21	11	33.6		14	8	53.7		8	8	26.2
	30	8	13.4		23	5	59.6		16	3	21.9		10	2	56.5
Apr	1	2	42.1		25	0	25.6		17	21	50.1		11	21	26.8
	2	21	10.7		26	18	51.5		19	16	18.4		13	15	57.2
	4	15	39.3		28	13	17.5		21	10	46.7		15	10	27.6
	6	10	7.8		30	7	43.5		23	5	15.1		17	4	58.0
	8	4	36.3	July	2	2	9.4		24	23	43.6		18	23	28.4
	9	23	4.7		3	20	35.3		26	18	12.1				
	11	17	33.0		5	15	1.2		28	12	40.8				

WASHINGTON MEAN TIME OF SUPERIOR GEOCENTRIC CONJUNCTION.

SATELLITE II.

	d	h m		d	h m		d	h m		d	h m
Jan.	19	5 32.2	Apr.	14	13 43.0	July	8	17 51.7	Oct.	1	22 50.4
	22	18 55.9		18	2 58.5		12	6 58.7		5	12 9.3
	26	8 19.4		21	16 13.6		15	20 6.5		9	1 29.8
	29	21 42.8		25	5 28.1		19	9 14.0		12	14 49.8
Feb.	2	11 5.9		28	18 42.1		22	22 22.4		16	4 11.3
	6	0 28.7	May	2	7 55.6		26	11 30.5		19	17 32.1
	9	13 51.4		5	21 8.6		30	0 39.6		23	6 54.4
	13	3 13.8		9	10 21.1	Aug.	2	13 48.4		26	20 16.0
	16	16 35.9		12	23 33.0		6	2 58.4		30	9 39.2
	20	5 57.7		16	12 44.4		9	16 8.1	Nov.	2	23 1.6
	23	19 19.3		20	1 55.3		13	5 19.1		6	12 25.4
	27	8 40.6		23	15 5.8		16	18 29.8		10	1 48.5
Mar.	2	22 1.5		27	4 15.8		20	7 42.0		13	15 13.0
	6	11 22.0		30	17 25.4		23	20 53.9		17	4 36.7
	10	0 42.3	June	3	6 34.6		27	10 7.3		20	18 1.7
	13	14 2.2		6	19 43.3		30	23 20.4		24	7 25.8
	17	3 21.8		10	8 51.8	Sept.	3	12 35.1		27	20 51.3
	20	16 40.9		13	21 59.7		7	1 49.5	Dec.	1	10 15.9
	24	5 59.7		17	11 7.6		10	15 5.4		4	23 41.7
	27	19 18.1		21	0 15.0		14	4 20.9		8	13 6.6
	31	8 36.0		24	13 22.5		17	17 38.1		12	2 32.7
Apr.	3	21 53.5		28	2 29.6		21	6 54.8		15	15 57.9
	7	11 10.4	July	1	15 37.1		24	20 13.1		19	5 24.1
	11	0 27.0		5	4 44.1		28	9 30.9			

SATELLITE III.

	d	h m		d	h m		d	h m		d	h m
Jan.	18	20 29.6	Apr.	14	23 18.9	July	9	17 23.4	Oct.	3	12 35.1
	26	0 55.8		22	3 11.1		16	20 40.6		10	16 38.6
Feb.	2	5 20.7		29	6 58.8		23	23 59.8		17	20 46.5
	9	9 44.5	May	6	10 41.6		31	3 20.8		25	0 57.6
	16	14 6.2		13	14 20.0	Aug.	7	6 44.7	Nov.	1	5 12.3
	23	18 26.3		20	17 54.6		14	10 12.6		8	9 29.2
Mar.	2	22 43.3		27	21 24.6		21	13 44.7		15	13 48.7
	10	2 57.5	June	4	0 51.1		28	17 22.0		22	18 10.6
	17	7 8.5		11	4 13.6	Sept.	4	21 3.5		29	22 34.5
	24	11 16.3		18	7 33.2		12	0 49.1	Dec.	7	3 0.8
	31	15 21.1		25	10 50.6		19	4 40.7		14	7 28.3
Apr.	7	19 21.7	July	2	14 6.8		26	8 35.7			

SATELLITE IV.

	d	h m		d	h m		d	h m		d	h m
Jan.	26	18 57.7	Apr.	20	18 43.1	July	12	23 9.2	Oct.	4	7 14.8
Feb.	12	15 14.0	May	7	11 33.8		29	13 35.1		21	1 55.1
Mar.	1	11 4.6		24	3 27.4	Aug.	15	4 38.4	Nov.	6	21 18.3
	18	6 22.2	June	9	18 29.8		31	20 32.6		23	17 16.0
Apr.	4	0 57.4		26	8 56.6	Sept.	17	13 25.2	Dec.	10	13 38.8

DIFFERENTIAL COORDINATES OF SATELLITE VI.

Washington Mean Noon.	$\alpha_{VI}-\alpha_{Jup.}$		$\delta_{VI}-\delta_{Jup.}$	Washington Mean Noon.	$\alpha_{VI}-\alpha_{Jup.}$		$\delta_{VI}-\delta_{Jup.}$	Washington Mean Noon.	$\alpha_{VI}-\alpha_{Jup.}$		$\delta_{VI}-\delta_{Jup.}$
	m	s	′		m	s	′		m	s	′
Feb. 15	−2	32	+11.3	May 20	+4	20	−12.1	Aug. 22	−2	37	−21.6
17	2	26	12.1	22	4	20	13.3	24	2	45	20.5
19	2	20	12.9	24	4	20	14.6	26	2	52	19.3
21	2	14	13.6	26	4	20	15.8	28	2	59	18.1
23	2	7	14.3	28	4	19	17.1	30	3	6	16.9
25	−2	0	+14.9	30	+4	18	−18.3	Sept. 1	−3	12	−15.7
27	1	52	15.4	June 1	4	16	19.5	3	3	18	14.5
Mar. 1	1	44	15.8	3	4	13	20.6	5	3	23	13.3
3	1	36	16.2	5	4	9	21.7	7	3	27	12.1
5	1	27	16.5	7	4	5	22.8	9	3	31	10.9
7	−1	17	+16.8	9	+4	0	−23.9	11	−3	35	− 9.7
9	1	7	17.0	11	3	54	25.0	13	3	38	8.5
11	0	57	17.1	13	3	48	26.0	15	3	41	7.4
13	0	46	17.1	15	3	41	27.0	17	3	43	6.2
15	0	35	17.1	17	3	34	27.9	19	3	44	5.0
17	−0	24	+17.0	19	+3	26	−28.8	21	−3	45	− 3.8
19	−0	12	16.9	21	3	18	29.6	23	3	45	2.6
21	0	0	16.7	23	3	9	30.4	25	3	45	1.4
23	+0	12	16.5	25	2	59	31.1	27	3	45	− 0.3
25	0	24	16.2	27	2	49	31.8	29	3	44	+ 0.8
27	+0	37	+15.8	29	+2	38	−32.4	Oct. 1	−3	42	+ 1.9
29	0	49	15.3	July 1	2	27	32.9	3	3	40	3.0
31	1	1	14.8	3	2	16	33.4	5	3	37	4.0
Apr. 2	1	13	14.2	5	2	4	33.8	7	3	34	5.1
4	1	25	13.6	7	1	52	34.1	9	3	31	6.1
6	+1	37	+12.9	9	+1	40	−34.3	11	−3	27	+ 7.1
8	1	49	12.1	11	1	28	34.4	13	3	23	8.0
10	2	0	11.2	13	1	15	34.5	15	3	18	8.9
12	2	11	10.3	15	1	2	34.5	17	3	13	9.7
14	2	22	9.4	17	0	49	34.5	19	3	7	10.5
16	+2	32	+ 8.4	19	+0	36	−34.4	21	−3	1	+11.3
18	2	42	7.3	21	0	23	34.1	23	2	54	12.0
20	2	52	6.2	23	+0	10	33.8	25	2	47	12.7
22	3	1	5.1	25	−0	3	33.4	27	2	40	13.3
24	3	10	4.0	27	0	16	32.9	29	2	32	13.9
26	+3	18	+ 2.9	29	−0	28	−32.3	31	−2	24	+14.4
28	3	26	1.7	31	0	41	31.7	Nov. 2	2	16	14.9
30	3	34	+ 0.5	Aug. 2	0	53	31.0	4	2	8	15.3
May 2	3	41	− 0.8	4	1	5	30.3	6	1	59	15.7
4	3	48	2.0	6	1	17	29.5	8	1	50	16.0
6	+3	54	− 3.3	8	−1	28	−28.7	10	−1	40	+16.2
8	3	59	4.5	10	1	39	27.9	12	1	30	16.4
10	4	4	5.8	12	1	50	27.0	14	1	20	16.5
12	4	8	7.0	14	2	0	26.0	16	1	10	16.5
14	4	12	8.3	16	2	10	25.0	18	−1	0	+16.5
16	+4	15	− 9.6	18	−2	19	−23.9				
18	+4	18	−10.8	20	−2	28	−22.8				

DIFFERENTIAL COORDINATES OF SATELLITE VII.

Washington Mean Noon.	$\alpha_{VII}-\alpha_{Jup.}$		$\delta_{VII}-\delta_{Jup.}$	Washington Mean Noon.	$\alpha_{VII}-\alpha_{Jup.}$		$\delta_{VII}-\delta_{Jup.}$	Washington Mean Noon.	$\alpha_{VII}-\alpha_{Jup.}$		$\delta_{VII}-\delta_{Jup.}$
	m	s	′		m	s	′		m	s	′
Feb. 15	−2	0	−17.8	May 20	−0	24	+25.9	Aug. 22	+4	13	+20.0
17	2	7	17.7	22	0	15	27.0	24	4	8	18.6
19	2	13	17.6	24	−0	5	28.1	26	4	2	17.2
21	2	19	17.4	26	+0	5	29.2	28	3	56	15.7
23	2	25	17.1	28	0	15	30.3	30	3	49	14.2
25	−2	30	−16.7	30	+0	26	+31.3	Sept. 1	+3	42	+12.7
27	2	35	16.3	June 1	0	36	32.3	3	3	34	11.1
Mar. 1	2	39	15.8	3	0	47	33.2	5	3	26	9.6
3	2	43	15.3	5	0	58	34.1	7	3	17	8.0
5	2	46	14.7	7	1	9	34.9	9	3	7	6.5
7	−2	49	−14.1	9	+1	20	+35.7	11	+2	57	+ 4.9
9	2	51	13.4	11	1	31	36.4	13	2	47	3.3
11	2	53	12.6	13	1	42	37.0	15	2	36	1.7
13	2	55	11.8	15	1	53	37.6	17	2	25	+ 0.1
15	2	56	10.9	17	2	4	38.1	19	2	13	− 1.4
17	−2	57	−10.0	19	+2	14	+38.6	21	+2	1	− 2.9
19	2	57	9.1	21	2	24	39.0	23	1	49	4.3
21	2	57	8.2	23	2	34	39.3	25	1	37	5.7
23	2	56	7.2	25	2	44	39.5	27	1	24	7.1
25	2	55	6.2	27	2	54	39.7	29	1	12	8.4
27	−2	54	− 5.2	29	+3	3	+39.8	Oct. 1	+0	59	− 9.7
29	2	52	4.2	July 1	3	12	39.8	3	0	47	10.9
31	2	50	3.1	3	3	21	39.7	5	0	34	12.0
Apr. 2	2	48	2.0	5	3	29	39.6	7	0	21	13.0
4	2	45	− 0.8	7	3	37	39.4	9	+0	9	14.0
6	−2	42	+ 0.3	9	+3	44	+39.2	11	−0	3	−14.9
8	2	39	1.5	11	3	51	38.9	13	0	15	15.7
10	2	36	2.6	13	3	57	38.5	15	0	27	16.4
12	2	32	3.7	15	4	3	38.0	17	0	38	17.1
14	2	28	4.8	17	4	8	37.5	19	0	49	17.6
16	−2	24	+ 6.0	19	+4	13	+37.0	21	−0	59	−18.1
18	2	19	7.1	21	4	18	36.4	23	1	9	18.5
20	2	14	8.3	23	4	22	35.8	25	1	19	18.7
22	2	9	9.4	25	4	26	35.1	27	1	29	18.9
24	2	3	10.6	27	4	29	34.3	29	1	38	19.0
26	−1	57	+11.7	29	+4	31	+33.5	31	−1	47	−19.0
28	1	51	12.9	31	4	33	32.7	Nov. 2	1	55	18.9
30	1	44	14.0	Aug. 2	4	34	31.8	4	2	2	18.7
May 2	1	37	15.2	4	4	34	30.8	6	2	9	18.5
4	1	30	16.4	6	4	34	29.8	8	2	15	18.2
6	−1	23	+17.6	8	+4	33	+28.7	10	−2	21	−17.8
8	1	16	18.8	10	4	32	27.6	12	2	26	17.3
10	1	8	20.0	12	4	30	26.4	14	2	30	16.7
12	1	0	21.2	14	4	28	25.2	16	2	33	16.0
14	0	51	22.4	16	4	25	24.0	18	−2	36	−15.3
16	−0	42	+23.6	18	+4	22	+22.7				
18	−0	33	+24.7	20	+4	18	+21.4				

WASHINGTON MEAN TIME.

JANUARY.

By reason of the proximity of JUPITER to the SUN the phenomena of the satellites are not given prior to January 17.

d	h	m	s			
17	13	39		I.	Sh.	In.
	14	10		I.	Tr.	In.
	15	55		I.	Sh.	Eg.
	16	27		I.	Tr.	Eg.
18	10	51	0	I.	Ec.	Dis.
	13	37		I.	Oc.	Re.
	16	58	38	III.	Ec.	Dis.
	21	58		III.	Oc.	Re.
19	3	7	48	II.	Ec.	Dis.
	6	55		II.	Oc.	Re.
	8	8		I.	Sh.	In.
	8	40		I.	Tr.	In.
	10	24		I.	Sh.	Eg.
	10	57		I.	Tr.	Eg.
20	5	19	27	I.	Ec.	Dis.
	8	7		I.	Oc.	Re.
	21	23		II.	Sh.	In.
	22	32		II.	Tr.	In.
21	0	8		II.	Sh.	Eg.
	1	19		II.	Tr.	Eg.
	2	36		I.	Sh.	In.
	3	10		I.	Tr.	In.
	4	52		I.	Sh.	Eg.
	5	27		I.	Tr.	Eg.
	23	48	1	I.	Ec.	Dis.
22	2	38		I.	Oc.	Re.
	6	46		III.	Sh.	In.
	9	8		III.	Tr.	In.
	9	37		III.	Sh.	Eg.
	12	5		III.	Tr.	Eg.
22	16	24	49	II.	Ec.	Dis.
	20	19		II.	Oc.	Re.
	21	4		I.	Sh.	In.
	21	40		I.	Tr.	In.
	23	20		I.	Sh.	Eg.
	23	57		I.	Tr.	Eg.
23	18	16	30	I.*	Ec.	Dis.
	21	8		I.	Oc.	Re.
24	10	41		II.	Sh.	In.
	11	57		II.	Tr.	In.
	13	26		II.	Sh.	Eg.
	14	44		II.	Tr.	Eg.
	15	33		I.	Sh.	In.
	16	10		I.	Tr.	In.
	17	49		I.	Sh.	Eg.
	18	27		I.	Tr.	Eg.
25	12	45	3	I.	Ec.	Dis.
	15	38		I.	Oc.	Re.
	20	56	37	III.	Ec.	Dis.
26	2	25		III.	Oc.	Re.
	5	41	47	II.	Ec.	Dis.
	9	43		II.	Oc.	Re.
	10	1		I.	Sh.	In.
	10	40		I.	Tr.	In.
	12	17		I.	Sh.	Eg.
	12	57		I.	Tr.	Eg.
27	7	13	30	I.	Ec.	Dis.
	10	8		I.	Oc.	Re.
	23	59		II.	Sh.	In.
28	1	23		II.	Tr.	In.
28	2	45		II.	Sh.	Eg.
	4	9		II.	Tr.	Eg.
	4	29		I.	Sh.	In.
	5	10		I.	Tr.	In.
	6	45		I.	Sh.	Eg.
	7	27		I.	Tr.	Eg.
29	1	42	3	I.	Ec.	Dis.
	4	38		I.	Oc.	Re.
	10	45		III.	Sh.	In.
	13	33		III.	Tr.	In.
	13	36		III.	Sh.	Eg.
	16	32		III.	Tr.	Eg.
	18	58	42	II.	Ec.	Dis.
	22	58		I.	Sh.	In.
	23	6		II.	Oc.	Re.
	23	40		I.	Tr.	In.
30	1	14		I.	Sh.	Eg.
	1	57		I.	Tr.	Eg.
	20	10	31	I.	Ec.	Dis.
	23	8		I.	Oc.	Re.
31	13	17		II.	Sh.	In.
	14	47		II.	Tr.	In.
	16	2		II.	Sh.	Eg.
	17	26		I.	Sh.	In.
	17	33		II.	Tr.	Eg.
	18	10		I.*	Tr.	In.
	19	42		I.	Sh.	Eg.
	20	27		I.	Tr.	Eg.

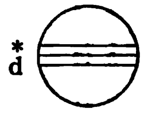
NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

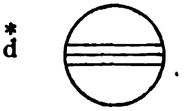
JANUARY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

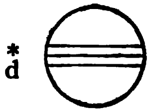
I.



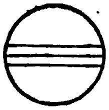
III.



II.



IV. No Eclipse.



Configurations at 18ʰ 15ᵐ for an Inverting Telescope.

Day.	West.		East.
1		○	
2		○	
3		○	
4		○	
5		○	
6		○	
7		○	
8		○	
9		○	
10		○	
11		○	
12		○	
13		○	
14		○	
15		○	
16		○	
17	·3 2· 1·	○	4·
18	·2 4·	○	·1 ·3 ●
19	4· 1·	○	·2 ·3
20	4·	○	2· 1· 3·
21	4· 2· ·1	○	3·
22	·4 3·	○	1· ·2 ●
23	·4 3· ·1	○	2·
24	○ 1· ·4 ·3 2·	○	
25	·4 ·2 ·3	○	·1
26	1·	·4 ○	·2 ·3
27		○	·1 2· ·4 ·3
28	2· ·1	○	3· ·4
29	·2 3·	○	1· ·4
30	3· ·1	○	·2 ·4
31	○ 1· ·3 2·	○	4·

WASHINGTON MEAN TIME.

FEBRUARY.

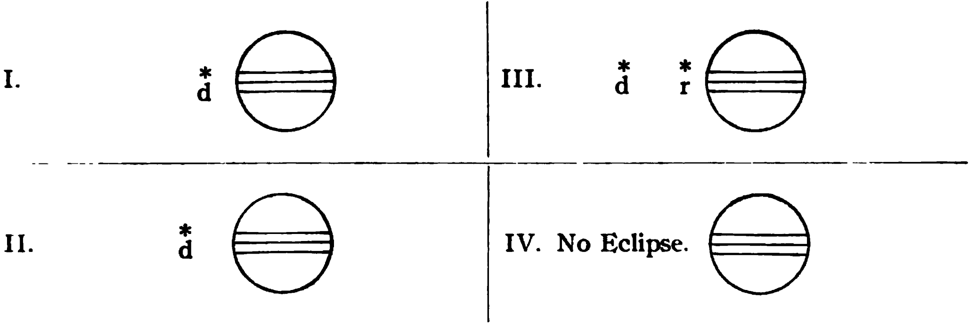
d	h	m	s			
1	14	39	3	I.	Ec.	Dis.
	17	39		I.*	Oc.	Re.
2	0	54	39	III.	Ec.	Dis.
	3	36	42	III.	Ec.	Re.
	3	51		III.	Oc.	Dis.
	6	51		III.	Oc.	Re.
	8	15	36	II.	Ec.	Dis.
	11	55		I.	Sh.	In.
	12	29		II.	Oc.	Re.
	12	40		I.	Tr.	In.
	14	11		I.	Sh.	Eg.
	14	57		I.	Tr.	Eg.
3	9	7	29	I.	Ec.	Dis.
	12	9		I.	Oc.	Re.
4	2	36		II.	Sh.	In.
	4	12		II.	Tr.	In.
	5	21		II.	Sh.	Eg.
	6	23		I.	Sh.	In.
	6	59		II.	Tr.	Eg.
	7	10		I.	Tr.	In.
	8	39		I.	Sh.	Eg.
	9	27		I.	Tr.	Eg.
5	3	36	2	I.	Ec.	Dis.
	6	39		I.	Oc.	Re.
	14	42		III.	Sh.	In.
	17	35		III.*	Sh.	Eg.
	17	56		III.*	Tr.	In.
	20	57		III.	Tr.	Eg.
	21	32	26	II.	Ec.	Dis.
6	0	51		I.	Sh.	In.
	1	40		I.	Tr.	In.
	1	52		II.	Oc.	Re.
	3	7		I.	Sh.	Eg.
	3	57		I.	Tr.	Eg.
	22	4	29	I.	Ec.	Dis.
7	1	9		I.	Oc.	Re.
	15	53		II.	Sh.	In.
	17	36		II.*	Tr.	In.
	18	39		II.	Sh.	Eg.
	19	19		I.	Sh.	In.
	20	10		I.	Tr.	In.
	20	23		II.	Tr.	Eg.
	21	36		I.	Sh.	Eg.
	22	26		I.	Tr.	Eg.
8	16	33	0	I.	Ec.	Dis.
	19	39		I.	Oc.	Re.
9	4	53	10	III.	Ec.	Dis.
	7	36	28	III.	Ec.	Re.
	8	14		III.	Oc.	Dis.
	10	49	15	II.	Ec.	Dis.
	11	15		III.	Oc.	Re.
	13	48		I.	Sh.	In.
	14	39		I.	Tr.	In.
	15	15		II.	Oc.	Re.
	16	4		I.	Sh.	Eg.
	16	56		I.	Tr.	Eg.
10	11	1	25	I.	Ec.	Dis.
	14	9		I.	Oc.	Re.
11	5	12		II.	Sh.	In.
	7	1		II.	Tr.	In.
	7	58		II.	Sh.	Eg.
	8	16		I.	Sh.	In.
	9	9		I.	Tr.	In.
	9	47		II.	Tr.	Eg.
	10	32		I.	Sh.	Eg.
	11	26		I.	Tr.	Eg.
12	5	29	58	I.	Ec.	Dis.
	8	39		I.	Oc.	Re.
	14	39		IV.	Oc.	Dis.
	15	49		IV.	Oc.	Re.
	18	40		III.	Sh.	In.
	21	34		III.	Sh.	Eg.
	22	18		III.	Tr.	In.
13	0	6	1	II.	Ec.	Dis.
	1	20		III.	Tr.	Eg.
	2	44		I.	Sh.	In.
	3	39		I.	Tr.	In.
	4	37		II.	Oc.	Re.
	5	1		I.	Sh.	Eg.
	5	56		I.	Tr.	Eg.
	23	58	24	I.	Ec.	Dis.
14	3	8		I.	Oc.	Re.
	18	30		II.	Sh.	In.
	20	24		II.	Tr.	In.
	21	13		I.	Sh.	In.
	21	15		II.	Sh.	Eg.
	22	9		I.	Tr.	In.
	23	11		II.	Tr.	Eg.
	23	29		I.	Sh.	Eg.
15	0	26		I.	Tr.	Eg.
	18	26	55	I.	Ec.	Dis.
	21	38		I.	Oc.	Re.
16	8	51	26	III.	Ec.	Dis.
	11	35	58	III.	Ec.	Re.
	12	35		III.	Oc.	Dis.
	13	22	46	II.	Ec.	Dis.
	15	38		III.	Oc.	Re.
	15	41		I.	Sh.	In.
	16	38		I.	Tr.	In.
	17	58		I.*	Sh.	Eg.
	18	0		II.*	Oc.	Re.
	18	55		I.	Tr.	Eg.
17	12	55	19	I.	Ec.	Dis.
	16	8		I.	Oc.	Re.
18	7	48		II.	Sh.	In.
	9	48		II.	Tr.	In.
	10	9		I.	Sh.	In.
	10	34		II.	Sh.	Eg.
	11	8		I.	Tr.	In.
	12	26		I.	Sh.	Eg.
	12	35		II.	Tr.	Eg.
	13	25		I.	Tr.	Eg.
19	7	23	50	I.	Ec.	Dis.
	10	38		I.	Oc.	Re.
	22	38		III.	Sh.	In.
20	1	33		III.	Sh.	Eg.
20	2	37		III.	Tr.	In.
	2	39	29	II.	Ec.	Dis.
	4	38		I.	Sh.	In.
	5	38		I.	Tr.	In.
	5	40		III.	Tr.	Eg.
	6	54		I.	Sh.	Eg.
	7	21		II.	Oc.	Re.
	7	54		I.	Tr.	Eg.
21	0	7		IV.	Tr.	In.
	1	21		IV.	Tr.	Eg.
	1	52	16	I.	Ec.	Dis.
	5	8		I.	Oc.	Re.
	21	6		II.	Sh.	In.
	23	6		I.	Sh.	In.
	23	11		II.	Tr.	In.
	23	52		II.	Sh.	Eg.
22	0	7		I.	Tr.	In.
	1	22		I.	Sh.	Eg.
	1	58		II.	Tr.	Eg.
	2	24		I.	Tr.	Eg.
	20	20	47	I.	Ec.	Dis.
	23	37		I.	Oc.	Re.
23	12	50	11	III.	Ec.	Dis.
	15	35	56	III.	Ec.	Re.
	15	56	11	II.	Ec.	Dis.
	16	54		III.*	Oc.	Dis.
	17	34		I.*	Sh.	In.
	18	37		I.	Tr.	In.
	19	51		I.	Sh.	Eg.
	19	59		III.	Oc.	Re.
	20	43		II.	Oc.	Re.
	20	54		I.	Tr.	Eg.
24	14	49	10	I.	Ec.	Dis.
	18	7		I.*	Oc.	Re.
25	10	25		II.	Sh.	In.
	12	3		I.	Sh.	In.
	12	34		II.	Tr.	In.
	13	6		I.	Tr.	In.
	13	11		II.	Sh.	Eg.
	14	19		I.	Sh.	Eg.
	15	22		II.	Tr.	Eg.
	15	23		I.	Tr.	Eg.
26	9	17	41	I.	Ec.	Dis.
	12	37		I.	Oc.	Re.
27	2	35		III.	Sh.	In.
	5	12	50	II.	Ec.	Dis.
	5	32		III.	Sh.	Eg.
	6	31		I.	Sh.	In.
	6	53		III.	Tr.	In.
	7	35		I.	Tr.	In.
	8	47		I.	Sh.	Eg.
	9	52		I.	Tr.	Eg.
	9	59		III.	Tr.	Eg.
	10	4		II.	Oc.	Re.
28	3	46	6	I.	Ec.	Dis.
	7	6		I.	Oc.	Re.
	23	42		II.	Sh.	In.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

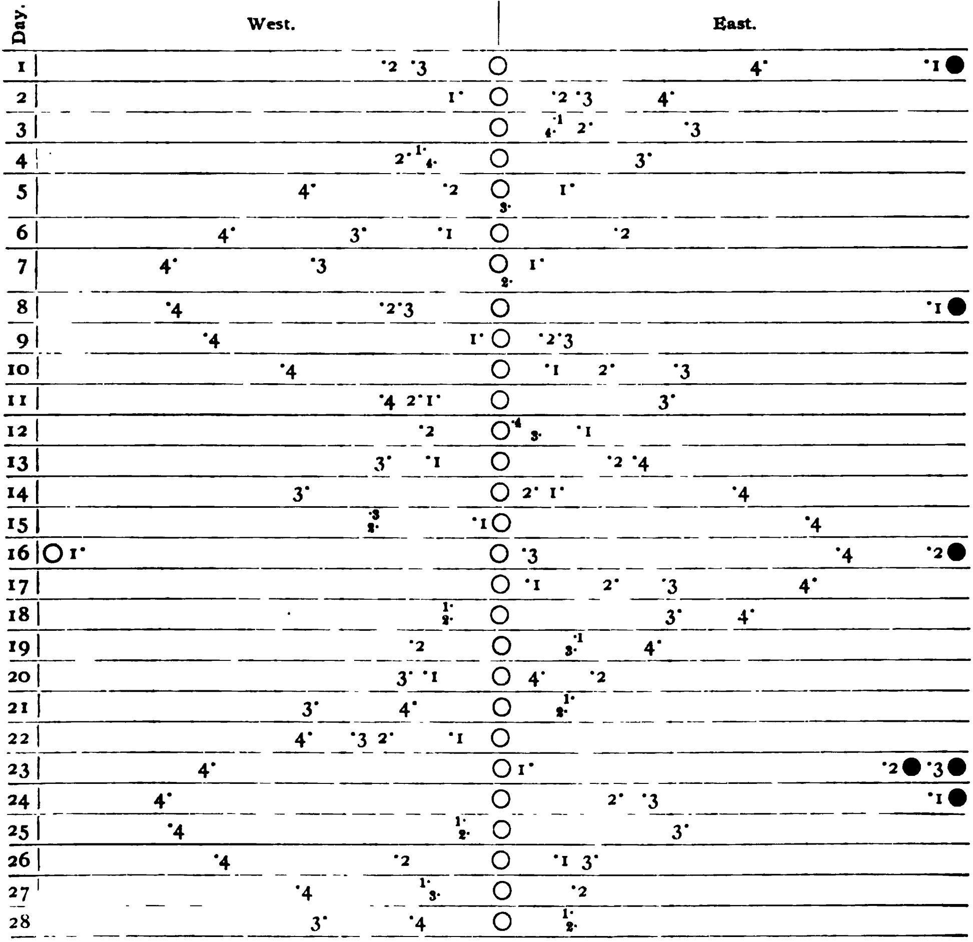
WASHINGTON MEAN TIME.

FEBRUARY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 17^h 30^m for an Inverting Telescope.



WASHINGTON MEAN TIME.

MARCH.

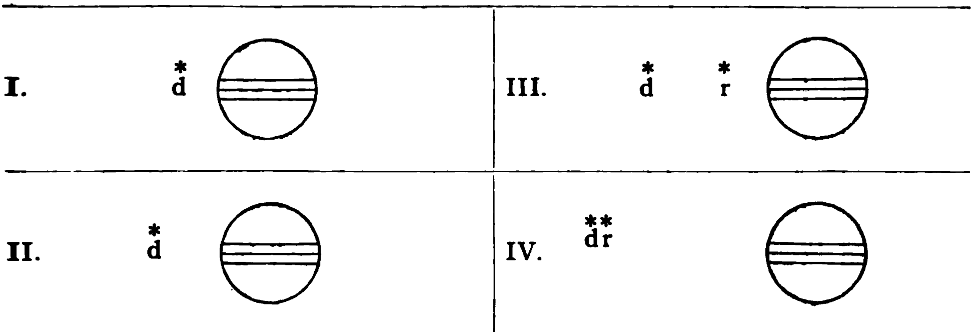
d	h	m	s			
1	0	59		I.	Sh.	In.
	1	57		II.	Tr.	In.
	2	5		I.	Tr.	In.
	2	28		II.	Sh.	Eg.
	3	16		I.	Sh.	Eg.
	4	22		I.	Tr.	Eg.
	4	44		II.	Tr.	Eg.
	10	14		IV.	Oc.	Dis.
	11	55		IV.	Oc.	Re.
	22	14	36	I.	Ec.	Dis.
2	1	36		I.	Oc.	Re.
	16	48	16	III.*	Ec.	Dis.
	18	29	29	II.	Ec.	Dis.
	19	28		I.	Sh.	In.
	19	35	14	III.	Ec.	Re.
	20	34		I.	Tr.	In.
	21	10		III.	Oc.	Dis.
	21	44		I.	Sh.	Eg.
	22	51		I.	Tr.	Eg.
	23	25		II.	Oc.	Re.
3	0	16		III.	Oc.	Re.
	16	42	59	I.*	Ec.	Dis.
	20	5		I.	Oc.	Re.
4	13	1		II.	Sh.	In.
	13	56		I.	Sh.	In.
	15	3		I.	Tr.	In.
	15	20		II.	Tr.	In.
	15	47		II.	Sh.	Eg.
	16	12		I.*	Sh.	Eg.
	17	21		I.*	Tr.	Eg.
	18	7		II.	Tr.	Eg.
5	11	11	29	I.	Ec.	Dis.
	14	35		I.	Oc.	Re.
6	6	33		III.	Sh.	In.
	7	46	7	II.	Ec.	Dis.
	8	24		I.	Sh.	In.
	9	31		III.	Sh.	Eg.
	9	33		I.	Tr.	In.
	10	41		I.	Sh.	Eg.
	11	8		III.	Tr.	In.
	11	50		I.	Tr.	Eg.
	12	46		II.	Oc.	Re.
	14	15		III.	Tr.	Eg.
7	5	39	53	I.	Ec.	Dis.
	9	4		I.	Oc.	Re.
8	2	19		II.	Sh.	In.
	2	52		I.	Sh.	In.
	4	2		I.	Tr.	In.
	4	41		II.	Tr.	In.
	5	5		II.	Sh.	Eg.
	5	9		I.	Sh.	Eg.
	6	19		I.	Tr.	Eg.
	7	29		II.	Tr.	Eg.
9	0	8	23	I.	Ec.	Dis.
	3	34		I.	Oc.	Re.
	19	31		IV.	Tr.	In.
	20	46	14	III.	Ec.	Dis.
	21	2	44	II.	Ec.	Dis.
	21	18		IV.	Tr.	Eg.
	21	21		I.	Sh.	In.
	22	31		I.	Tr.	In.
	23	34	24	III.	Ec.	Re.
	23	37		I.	Sh.	Eg.
10	0	48		I.	Tr.	Eg.
	1	24		III.	Oc.	Dis.
	2	6		II.	Oc.	Re.
10	4	31		III.	Oc.	Re.
	18	36	45	I.	Ec.	Dis.
	22	3		I.	Oc.	Re.
11	15	37		II.*	Sh.	In.
	15	49		I.*	Sh.	In.
	17	0		I.*	Tr.	In.
	18	3		II.	Tr.	In.
	18	6		I.	Sh.	Eg.
	18	24		II.	Sh.	Eg.
	19	18		I.	Tr.	Eg.
	20	52		II.	Tr.	Eg.
12	13	5	15	I.	Ec.	Dis.
	16	32		I.*	Oc.	Re.
13	10	17		I.	Sh.	In.
	10	19	19	II.	Ec.	Dis.
	10	31		III.	Sh.	In.
	11	29		I.	Tr.	In.
	12	34		I.	Sh.	Eg.
	13	30		III.	Sh.	Eg.
	13	47		I.	Tr.	Eg.
	15	20		III.	Tr.	In.
	15	26		II.*	Oc.	Re.
	18	28		III.	Tr.	Eg.
14	7	33	39	I.	Ec.	Dis.
	11	1		I.	Oc.	Re.
15	4	46		I.	Sh.	In.
	4	55		II.	Sh.	In.
	5	59		I.	Tr.	In.
	7	2		I.	Sh.	Eg.
	7	24		II.	Tr.	In.
	7	41		II.	Sh.	Eg.
	8	16		I.	Tr.	Eg.
	10	12		II.	Tr.	Eg.
16	2	2	9	I.	Ec.	Dis.
	5	31		I.	Oc.	Re.
	23	14		I.	Sh.	In.
	23	35	55	II.	Ec.	Dis.
17	0	28		I.	Tr.	In.
	0	44	0	III.	Ec.	Dis.
	1	31		I.	Sh.	Eg.
	2	45		I.	Tr.	Eg.
	3	33	22	III.	Ec.	Re.
	4	46		II.	Oc.	Re.
	5	34		III.	Oc.	Dis.
	8	43		III.	Oc.	Re.
	18	21	43	IV.	Ec.	Dis.
	19	13	21	IV.	Ec.	Re.
	20	30	30	I.	Ec.	Dis.
18	0	0		I.	Oc.	Re.
	5	19		IV.	Oc.	Dis.
	7	25		IV.	Oc.	Re.
	17	42		I.	Sh	In.
	18	14		II.	Sh.	In.
	18	56		I.	Tr.	In.
	19	59		I.	Sh.	Eg.
	20	46		II.	Tr.	In.
	21	0		II.	Sh.	Eg.
	21	14		I.	Tr.	Eg.
	23	34		II.	Tr.	Eg.
19	14	59	0	I.*	Ec.	Dis.
	18	29		I.	Oc.	Re.
20	12	10		I.	Sh.	In.
	12	52	30	II.	Ec.	Dis.
	13	25		I.	Tr.	In.
	14	27		I.	Sh.	Eg.
	14	29		III.	Sh.	In.
20	15	43		I.*	Tr.	Eg.
	17	29		III.*	Sh.	Eg.
	18	5		II.	Oc.	Re.
	19	29		III.	Tr.	In.
	22	39		III.	Tr.	Eg.
21	9	27	23	I.	Ec.	Dis.
	12	58		I.	Oc.	Re.
22	6	39		I.	Sh.	In.
	7	31		II.	Sh.	In.
	7	54		I.	Tr.	In.
	8	55		I.	Sh.	Eg.
	10	6		II.	Tr.	In.
	10	12		I.	Tr.	Eg.
	10	18		II.	Sh.	Eg.
	12	54		II.	Tr.	Eg.
23	3	55	52	I.	Ec.	Dis.
	7	27		I.	Oc.	Re.
24	1	7		I.	Sh.	In.
	2	9	5	II.	Ec.	Dis.
	2	23		I.	Tr.	In.
	3	24		I.	Sh.	Eg.
	4	40		I.	Tr.	Eg.
	4	41	52	III.	Ec.	Dis.
	7	24		II.	Oc.	Re.
	7	32	25	III.	Ec.	Re.
	9	41		III.	Oc.	Dis.
	12	52		III.	Oc.	Re.
	22	24	14	I.	Ec.	Dis.
25	1	56		I.	Oc.	Re
	19	35		I.	Sh.	In.
	20	50		II.	Sh.	In.
	20	52		I.	Tr.	In.
	21	52		I.	Sh.	Eg.
	23	9		I.	Tr.	Eg.
	23	26		II.	Tr.	In.
	23	37		II.	Sh.	Eg.
26	2	14		II.	Tr.	Eg.
	2	41		IV.	Sh.	In.
	3	36		IV.	Sh.	Eg.
	14	21		IV.	Tr.	In.
	16	31		IV.*	Tr.	Eg.
	16	52	43	I.*	Ec.	Dis.
	20	25		I.	Oc.	Re.
27	14	4		I.	Sh.	In.
	15	20		I.*	Tr.	In.
	15	25	40	II.*	Ec.	Dis.
	16	20		I.*	Sh.	Eg.
	17	38		I.	Tr.	Eg.
	18	27		III.	Sh.	In.
	20	42		II.	Oc.	Re.
	21	28		III.	Sh.	Eg.
	23	34		III.	Tr.	In.
28	2	45		III.	Tr.	Eg.
	11	21	6	I.	Ec.	Dis.
	14	53		I.*	Oc.	Re.
29	8	32		I.	Sh.	In.
	9	49		I.	Tr.	In.
	10	7		II.	Sh.	In.
	10	49		I.	Sh.	Eg.
	12	6		I.	Tr.	Eg.
	12	45		II.	Tr.	In.
	12	54		II.	Sh.	Eg.
	15	33		II.*	Tr.	Eg.
30	5	49	35	I.	Ec.	Dis
	9	22		I.	Oc.	Re.
31	3	0		I.	Sh.	In.
	4	17		I.	Tr.	In.
	4	42	15	II.	Ec.	Dis.
	5	17		I.	Sh.	Eg.
	6	35		I.	Tr.	Eg.
	8	40	16	III.	Ec.	Dis.
	10	0		II.	Oc.	Re.
	11	32	0	III.	Ec.	Re.
	13	45		III.	Oc.	Dis.
	16	57		III.*	Oc.	Re.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

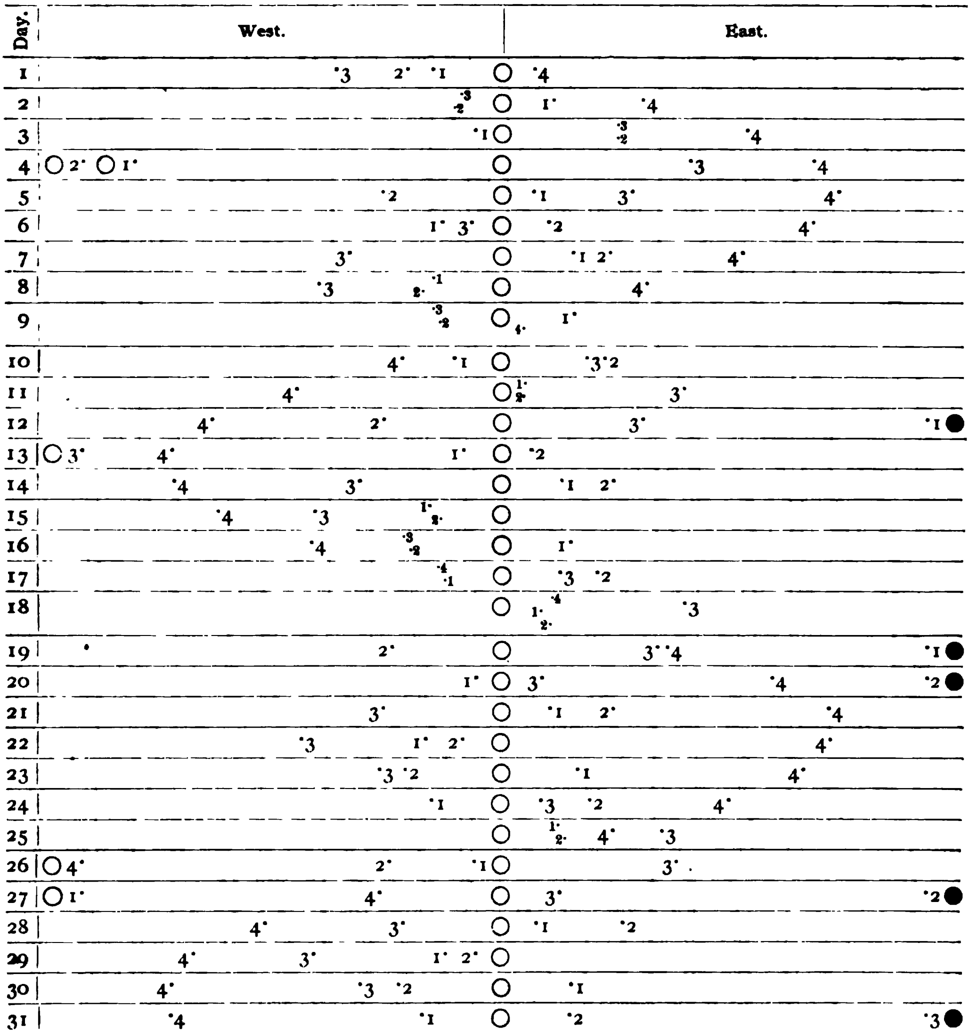
WASHINGTON MEAN TIME.

MARCH.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 16h 30m for an Inverting Telescope.



WASHINGTON MEAN TIME.

APRIL.

d	h	m	s			
1	0	17	56	I.	Ec.	Dis.
	3	51		I.	Oc.	Re.
	21	28		I.	Sh.	In.
	22	46		I.	Tr.	In.
	23	26		II.	Sh.	In.
	23	45		I.	Sh.	Eg.
2	1	3		I.	Tr.	Eg.
	2	5		II.	Tr.	In.
	2	13		II.	Sh.	Eg.
	4	53		II.	Tr.	Eg.
	18	46	25	I.	Ec.	Dis.
	22	20		I.	Oc.	Re.
3	12	8	0	IV.	Ec.	Dis.
	13	28	17	IV.	Ec.	Re.
	15	57		I.*	Sh.	In.
	17	14		I.*	Tr.	In.
	17	58	51	II.	Ec.	Dis.
	18	13		I.	Sh.	Eg.
	19	32		I.	Tr.	Eg.
	22	24		III.	Sh.	In.
	23	18		II.	Oc.	Re.
	23	46		IV.	Oc.	Dis.
4	1	27		III.	Sh.	Eg.
	2	9		IV.	Oc.	Re.
	3	36		III.	Tr.	In.
	6	48		III.	Tr.	Eg.
	13	14	48	I.	Ec.	Dis.
	16	48		I.*	Oc.	Re.
5	10	25		I.	Sh.	In.
	11	43		I.	Tr.	In.
	12	42		I.	Sh.	Eg.
	12	44		II.	Sh.	In.
	14	0		I.	Tr.	Eg.
	15	23		II.*	Tr.	In.
	15	31		II.*	Sh.	Eg.
	18	11		II.	Tr.	Eg.
6	7	43	17	I.	Ec.	Dis.
	11	17		I.	Oc.	Re.
7	4	53		I.	Sh.	In.
	6	11		I.	Tr.	In.
	7	10		I.	Sh.	Eg.
	7	15	27	II.	Ec.	Dis.
	8	29		I.	Tr.	Eg.
	12	35		II.	Oc.	Re.
	12	38	27	III.	Ec.	Dis.
	15	31	20	III.*	Ec.	Re.
	17	45		III.	Oc.	Dis.
	20	58		III.	Oc.	Re.
8	2	11	38	I.	Ec.	Dis.
	5	45		I.	Oc.	Re.
	23	21		I.	Sh.	In.
9	0	39		I.	Tr.	In.
	1	38		I.	Sh.	Eg.
	2	2		II.	Sh.	In.
	2	57		I.	Tr.	Eg.
	4	41		II.	Tr.	In.
	4	49		II.	Sh.	Eg.
	7	30		II.	Tr.	Eg.
	20	40	7	I.	Ec.	Dis.
10	0	14		I.	Oc.	Re.
	17	50		I.	Sh.	In.
	19	8		I.	Tr.	In.
	20	7		I.	Sh.	Eg.
	20	32	5	II.	Ec.	Dis.
	21	25		I.	Tr.	Eg.
11	1	52		II.	Oc.	Re.
11	2	22		III.	Sh.	In.
	5	25		III.	Sh.	Eg.
	7	33		III.	Tr.	In.
	10	46		III.	Tr.	Eg.
	15	8	30	I.*	Ec.	Dis.
	18	42		I.	Oc.	Re.
	20	30		IV.	Sh.	In.
	21	55		IV.	Sh.	Eg.
12	8	29		IV.	Tr.	In.
	10	54		IV.	Tr.	Eg.
	12	18		I.	Sh.	In.
	13	36		I.*	Tr.	In.
	14	35		I.*	Sh.	Eg.
	15	19		II.*	Sh.	In.
	15	53		I.*	Tr.	Eg.
	17	58		II.	Tr.	In.
	18	7		II.	Sh.	Eg.
	20	47		II.	Tr.	Eg.
13	9	36	59	I.	Ec.	Dis.
	13	10		I.	Oc.	Re.
14	6	46		I.	Sh.	In.
	8	4		I.	Tr.	In.
	9	3		I.	Sh.	Eg.
	9	48	42	II.	Ec.	Dis.
	10	21		I.	Tr.	Eg.
	15	8		II.*	Oc.	Re.
	16	37	8	III.*	Ec.	Dis.
	19	31	10	III.	Ec.	Re.
	21	42		III.	Oc.	Dis.
15	0	56		III.	Oc.	Re.
	4	5	20	I.	Ec.	Dis.
	7	38		I.	Oc.	Re.
16	1	15		I.	Sh.	In.
	2	32		I.	Tr.	In.
	3	32		I.	Sh.	Eg.
	4	38		II.	Sh.	In.
	4	49		I.	Tr.	Eg.
	7	16		II.	Tr.	In.
	7	26		II.	Sh.	Eg.
	10	5		II.	Tr.	Eg.
	22	33	49	I.	Ec.	Dis.
17	2	6		I.	Oc.	Re.
	19	43		I.	Sh.	In.
	21	0		I.	Tr.	In.
	22	0		I.	Sh.	Eg.
	23	5	22	II.	Ec.	Dis.
	23	17		I.	Tr.	Eg.
18	4	23		II.	Oc.	Re.
	6	19		III.	Sh.	In.
	9	24		III.	Sh.	Eg.
	11	26		III.	Tr.	In.
	14	41		III.*	Tr.	Eg.
	17	2	12	I.	Ec.	Dis.
	20	35		I.	Oc.	Re.
19	14	11		I.*	Sh.	In.
	15	28		I.*	Tr.	In.
	16	28		I.*	Sh.	Eg.
	17	45		I.	Tr.	Eg.
	17	56		II.	Sh.	In.
	20	33		II.	Tr.	In.
	20	43		II.	Sh.	Eg.
	23	22		II.	Tr.	Eg.
20	5	58	14	IV.	Ec.	Dis.
	7	39	30	IV.	Ec.	Re.
	11	30	41	I.	Ec.	Dis.
	15	3		I.*	Oc.	Re.
20	17	26		IV.	Oc.	Dis.
	20	1		IV.	Oc.	Re.
21	8	39		I.	Sh.	In.
	9	55		I.	Tr.	In.
	10	56		I.	Sh.	Eg.
	12	13		I.	Tr.	Eg.
	12	22	2	II.	Ec.	Dis.
	17	38		II.	Oc.	Re.
	20	35	11	III.	Ec.	Dis.
	23	30	22	III.	Ec.	Re.
22	1	34		III.	Oc.	Dis.
	4	48		III.	Oc.	Re.
	5	59	2	I.	Ec.	Dis.
	9	31		I.	Oc.	Re.
23	3	8		I.	Sh.	In.
	4	23		I.	Tr.	In.
	5	25		I.	Sh.	Eg.
	6	41		I.	Tr.	Eg.
	7	14		II.	Sh.	In.
	9	48		II.	Tr.	In.
	10	2		II.	Sh.	Eg.
	12	37		II.	Tr.	Eg.
24	0	27	31	I.	Ec.	Dis.
	3	58		I.	Oc.	Re.
	21	36		I.	Sh.	In.
	22	51		I.	Tr.	In.
	23	53		I.	Sh.	Eg.
25	1	8		I.	Tr.	Eg.
	1	38	45	II.	Ec.	Dis.
	6	53		II.	Oc.	Re.
	10	18		III.	Sh.	In.
	13	23		III.*	Sh.	Eg.
	15	16		III.*	Tr.	In.
	18	31		III.	Tr.	Eg.
	18	55	54	I.	Ec.	Dis.
	22	26		I.	Oc.	Re.
26	16	4		I.*	Sh.	In.
	17	18		I.	Tr.	In.
	18	21		I.	Sh.	Eg.
	19	36		I.	Tr.	Eg.
	20	32		II.	Sh.	In.
	23	3		II.	Tr.	In.
	23	19		II.	Sh.	Eg.
27	1	52		II.	Tr.	Eg.
	13	24	24	I.*	Ec.	Dis.
	16	54		I.	Oc.	Re.
28	10	32		I.	Sh.	In.
	11	46		I.	Tr.	In.
	12	50		I.	Sh.	Eg.
	14	4		I.*	Tr.	Eg.
	14	22		IV.*	Sh.	In.
	14	55	29	II.*	Ec.	Dis.
	16	9		IV.*	Sh.	Eg.
	20	7		II.	Oc.	Re.
29	0	33	11	III.	Ec.	Dis.
	1	43		IV.	Tr.	In.
	3	29	29	III.	Ec.	Re.
	4	19		IV.	Tr.	Eg.
	5	21		III.	Oc.	Dis.
	7	52	45	I.	Ec.	Dis.
	8	37		III.	Oc.	Re.
	11	22		I.	Oc.	Re.
30	5	1		I.	Sh.	In.
	6	13		I.	Tr.	In.
	7	18		I.	Sh.	Eg.
	8	31		I.	Tr.	Eg.
	9	50		II.	Sh.	In.
	12	18		II.	Tr.	In.
	12	38		II.*	Sh.	Eg.
	15	7		II.*	Tr.	Eg.

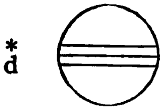
NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

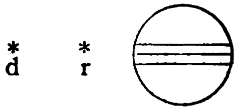
APRIL.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

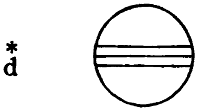
I.



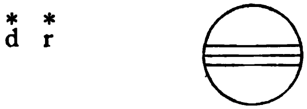
III.



II.



IV.



Configurations at 15ʰ 0ᵐ for an Inverting Telescope.

Day.	West.		East.
1	·4	○	1·2· ·3
2	·4 2· ·1	○	3·
3	·4 ·2	○	1· 3·
4	3·	○	·4 ·2 ·1 ●
5	3· 1·	○ 2·	·4
6	·3 ·2	○	·1 ·4
7	1·	○	·2 ·4 ·3 ●
8		○	·1 2· ·3 4·
9	·1 2·	○	3· 4·
10	·2	○	1· 3· 4·
11	3· ·1	○	4· ·2
12	○ 1· 3· 4·	○	2·
13	·34· 2·	○	·1
14	4· ·3 1·	○	·2 ●
15	4·	○	·1 ·3 2·
16	·4 ·1 2·	○	·3
17	·4 ·2	○	1· 3·
18	·4 ·1 3·	○	·2
19	3· ·4	○	1· 2·
20	·3 2· ·4	○	·1 ●
21	·3 1·	○	·4 ·2 ●
22		○	·1 ·3 2· ·4
23	1· 2·	○	·3 ·4
24	·2	○	1· 3· ·4
25	·1	○ 3·	·2 4·
26	3·	○	1· 2· 4·
27	·3 2·	○	4· ·1 ●
28	·3 1·	○	4· ·2 ●
29	4·	○	·3 ·1 ·2
30	○ 2· 4· 1·	○	·3

WASHINGTON MEAN TIME.

MAY.

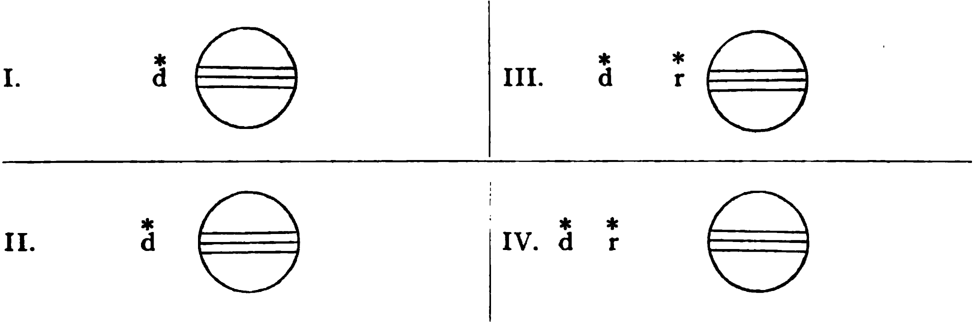
d	h	m	s			
1	2	21	14	I.	Ec.	Dis.
	5	49		I.	Oc.	Re.
	23	29		I.	Sh.	In.
2	0	41		I.	Tr.	In.
	1	46		I.	Sh	Eg.
	2	59		I.	Tr.	Eg.
	4	12	13	II.	Ec.	Dis.
	9	20		II.	Oc.	Re.
	14	16		III.*	Sh.	In.
	17	22		III.	Sh.	Eg.
	19	1		III.	Tr.	In.
	20	49	38	I.	Ec.	Dis.
	22	17		III.	Tr.	Eg.
3	0	17		I.	Oc.	Re.
	17	57		I.	Sh.	In.
	19	8		I.	Tr.	In.
	20	14		I.	Sh.	Eg.
	21	26		I.	Tr.	Eg.
	23	7		II.	Sh.	In.
4	1	31		II.	Tr.	In.
	1	55		II.	Sh.	Eg.
	4	21		II.	Tr.	Eg.
	15	18	8	I.*	Ec.	Dis.
	18	44		I.	Oc.	Re.
5	12	26		I.*	Sh.	In.
	13	35		I.*	Tr.	In.
	14	43		I.*	Sh.	Eg.
	15	53		I.*	Tr.	Eg.
	17	29	3	II.	Ec.	Dis.
	22	33		II.	Oc.	Re.
6	4	31	5	III.	Ec.	Dis.
	7	28	29	III.	Ec.	Re.
	9	4		III.	Oc.	Dis.
	9	46	30	I.	Ec.	Dis.
	12	20		III.*	Oc.	Re.
	13	12		I.*	Oc.	Re.
	23	51	14	IV.	Ec.	Dis.
7	1	49	40	IV.	Ec.	Re.
	6	54		I.	Sh.	In.
	8	3		I.	Tr.	In.
	9	11		I.	Sh.	Eg.
	10	12		IV.	Oc.	Dis.
	10	21		I.	Tr.	Eg.
	12	26		II.*	Sh.	In.
	12	55		IV.*	Oc.	Re.
	14	45		II.*	Tr.	In.
	15	14		II.*	Sh.	Eg.
	17	35		II.	Tr.	Eg.
8	4	14	59	I.	Ec.	Dis.
	7	39		I.	Oc.	Re.
9	1	22		I.	Sh.	In.
	2	30		I.	Tr.	In.
	3	39		I.	Sh.	Eg.
	4	48		I.	Tr.	Eg.
	6	45	53	II.	Ec.	Dis.
	11	46		II.	Oc.	Re.
	18	14		III.	Sh.	In.
	21	22		III.	Sh.	Eg.
	22	42		III.	Tr.	In.
	22	43	23	I.	Ec.	Dis.
10	1	58		III.	Tr.	Eg.
	2	6		I.	Oc.	Re.
	19	51		I.	Sh.	In.
	20	57		I.	Tr.	In.
	22	8		I.	Sh.	Eg.
	23	15		I.	Tr.	Eg.
11	1	43		II.	Sh.	In.
	3	58		II.	Tr.	In.
	4	31		II.	Sh.	Eg.
	6	47		II.	Tr.	Eg.
	17	11	54	I.	Ec.	Dis.
	20	33		I.	Oc.	Re.
12	14	19		I.*	Sh.	In.
	15	24		I.*	Tr.	In.
	16	36		I.	Sh.	Eg.
	17	42		I.	Tr.	Eg.
	20	2	48	II.	Ec.	Dis.
13	0	58		II.	Oc.	Re.
	8	29	9	III.	Ec.	Dis.
	11	27	39	III.	Ec.	Re.
	11	40	17	I.*	Ec.	Dis.
	12	42		III.*	Oc.	Dis.
	15	0		I.*	Oc.	Re.
	15	58		III.*	Oc.	Re.
14	8	47		I.	Sh.	In.
	9	51		I.	Tr.	In.
	11	5		I.	Sh.	Eg.
	12	9		I.*	Tr.	Eg.
	15	2		II.*	Sh.	In.
	17	10		II.	Tr.	In.
	17	50		II.	Sh.	Eg.
	20	0		II.	Tr.	Eg.
15	6	8	46	I.	Ec.	Dis.
	8	16		IV.	Sh.	In.
	9	27		I.	Oc.	Re.
	10	22		IV.	Sh.	Eg.
	18	1		IV.	Tr.	In.
	20	44		IV.	Tr.	Eg.
16	3	16		I.	Sh.	In.
	4	18		I.	Tr.	In.
	5	33		I.	Sh.	Eg.
	6	36		I.	Tr.	Eg.
	9	19	42	II.	Ec.	Dis.
	14	9		II.*	Oc.	Re.
	22	12		III.	Sh.	In.
17	0	37	11	I.	Ec.	Dis.
	1	21		III.	Sh.	Eg.
	2	18		III.	Tr.	In.
	3	54		I.	Oc.	Re.
	5	35		III.	Tr.	Eg.
	21	44		I.	Sh.	In.
	22	45		I.	Tr.	In.
18	0	1		I.	Sh.	Eg.
	1	3		I.	Tr.	Eg.
	4	19		II.	Sh.	In.
	6	22		II.	Tr.	In.
	7	7		II.	Sh.	Eg.
	9	10		II.	Tr.	Eg.
	19	5	42	I.	Ec.	Dis.
	22	21		I.	Oc.	Re.
19	16	12		I.*	Sh.	In.
	17	12		I.	Tr.	In.
	18	30		I.	Sh.	Eg.
	19	30		I.	Tr.	Eg.
	22	36	43	II.	Ec.	Dis.
20	3	20		II.	Oc.	Re.
	12	27	50	III.*	Ec.	Dis.
	13	34	6	I.*	Ec.	Dis.
	15	27	25	III.*	Ec.	Re.
	16	16		III.	Oc.	Dis.
	16	48		I.	Oc.	Re.
	19	33		III.	Oc.	Re.
21	10	41		I.	Sh.	In.
	11	38		I.*	Tr.	In.
	12	58		I.*	Sh.	Eg.
	13	56		I.*	Tr.	Eg.
	17	37		II.	Sh.	In.
	19	33		II.	Tr.	In.
	20	26		II.	Sh.	Eg.
	22	23		II.	Tr.	Eg.
22	8	2	36	I.	Ec.	Dis.
	11	15		I.*	Oc.	Re.
23	5	9		I.	Sh.	In.
	6	5		I.	Tr.	In.
	7	26		I.	Sh.	Eg.
	8	23		I.	Tr.	Eg.
	11	53	43	II.*	Ec.	Dis.
	16	31		II.	Oc.	Re.
	17	45	16	IV.	Ec.	Dis.
	19	58	44	IV.	Ec.	Re.
24	2	3		IV.	Oc.	Dis.
	2	10		III.	Sh.	In.
	2	31	2	I.	Ec.	Dis.
	4	52		IV.	Oc.	Re.
	5	20		III.	Sh.	Eg.
	5	42		I.	Oc.	Re.
	5	50		III.	Tr.	In.
	9	6		III.	Tr.	Eg.
	23	38		I.	Sh.	In.
25	0	32		I.	Tr.	In.
	1	55		I.	Sh.	Eg.
	2	50		I.	Tr.	Eg.
	6	55		II.	Sh.	In.
	8	44		II.	Tr.	In.
	9	43		II.	Sh.	Eg.
	11	33		II.*	Tr.	Eg.
	20	59	34	I.	Ec.	Dis.
26	0	9		I.	Oc.	Re.
	18	6		I.	Sh.	In.
	18	58		I.	Tr.	In.
	20	23		I.	Sh.	Eg.
	21	16		I.	Tr.	Eg.
27	1	10	51	II.	Ec.	Dis.
	5	41		II.	Oc.	Re.
	15	27	59	I.*	Ec.	Dis.
	16	26	22	III.	Ec.	Dis.
	18	35		I.	Oc.	Re.
	19	27	1	III.	Ec.	Re.
	19	46		III.	Oc.	Dis.
	23	3		III.	Oc.	Re.
28	12	34		I.*	Sh.	In.
	13	25		I.*	Tr.	In.
	14	52		I.*	Sh.	Eg.
	15	43		I.*	Tr.	Eg.
	20	13		II.	Sh.	In.
	21	54		II.	Tr.	In.
	23	2		II.	Sh.	Eg.
29	0	44		II.	Tr.	Eg.
	9	56	29	I.	Ec.	Dis.
	13	2		I.*	Oc.	Re.
30	7	3		I.	Sh.	In.
	7	51		I.	Tr.	In.
	9	20		I.	Sh.	Eg.
	10	9		I.	Tr.	Eg.
	14	27	56	II.*	Ec.	Dis.
	18	50		II.	Oc.	Re.
31	4	24	56	I.	Ec.	Dis.
	6	8		III.	Sh.	In.
	7	28		I.	Oc.	Re.
	9	17		III.	Tr.	In.
	9	19		III.	Sh.	Eg.
	12	34		III.*	Tr.	Eg.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

MAY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 14h 0m for an Inverting Telescope.

Day.	West.		East.
1	4· ·2	○	·1 3·
2	4· ·1	○	·2 3·
3	·4 3·	○	1· 2·
4	·4 3· 2· ·1	○	
5	○ 1· ·4 ·3 ·2	○	
6	·4	○	·3 .1 ·2
7	1·	○	·4 2· ·3
8	·2	○	·1 ·4 3·
9	1·	○	·2 3· ·4
10	3·	○	1· 2· ·4
11	3· 2· ·1	○	·4
12	·3 ·2	○	1· 4·
13		○	·2 4· ·1 ● ·3 ●
14	1·	○	2· ·3 4·
15	2·	○	4· ·1 3·
16	4· 1·	○	3· ·2 ●
17	4· 3·	○	1· 2·
18	4· 3· ·1 2·	○	
19	4· ·3 ·2	○	1·
20	·4	○	·2 ·1 ● ·3 ●
21	·4 1·	○	2· ·3
22	·4 2·	○	·1 3·
23	·4 1·	○	3· ·2 ●
24	3·	○	·4 ·1 2·
25	3· ·1 2·	○	·4
26	·3 ·2	○	1· ·4
27	·3 ·1	○	·2 ·4
28	○ 1·	○	2· ·3 4·
29	2·	○	·1 ·3 4·
30	1· ·2	○	3· 4·
31	3·	○	·1 ·2 4·

WASHINGTON MEAN TIME.

JUNE.

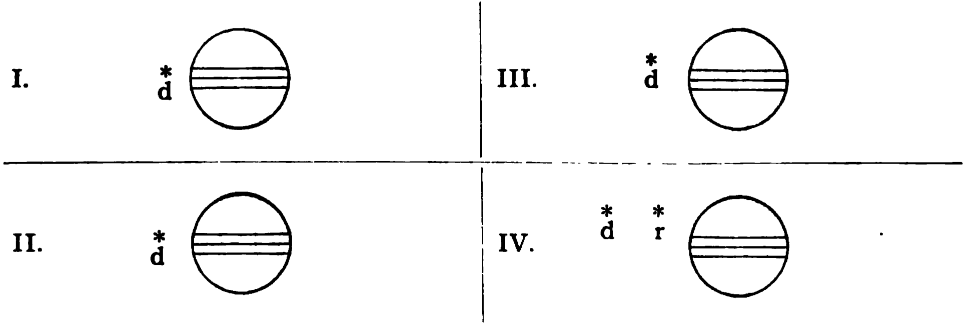
d	h	m	s			
1	1	31		I.	Sh.	In.
	2	14		IV.	Sh.	In.
	2	18		I.	Tr.	In.
	3	49		I.	Sh.	Eg.
	4	34		IV.	Sh.	Eg.
	4	36		I.	Tr.	Eg.
	9	24		IV.	Tr.	In.
	9	30		II.	Sh.	In.
	11	3		II.*	Tr.	In.
	12	12		IV.*	Tr.	Eg.
	12	19		II.*	Sh.	Eg.
	13	53		II.*	Tr.	Eg.
	22	53	29	I.	Ec.	Dis.
2	1	55		I.	Oc.	Re.
	20	0		I.	Sh.	In.
	20	44		I.	Tr.	In.
	22	17		I.	Sh.	Eg.
	23	2		I.	Tr.	Eg.
3	3	45	13	II.	Ec.	Dis.
	8	0		II.	Oc.	Re.
	17	21	55	I.	Ec.	Dis.
	20	21		I.	Oc.	Re.
	20	25	27	III.	Ec.	Dis.
4	2	30		III.	Oc.	Re.
	14	28		I.*	Sh.	In.
	15	10		I.*	Tr.	In.
	16	46		I.	Sh.	Eg.
	17	28		I.	Tr.	Eg.
	22	49		II.	Sh.	In.
5	0	13		II.	Tr.	In.
	1	37		II.	Sh.	Eg.
	3	3		II.	Tr.	Eg.
	11	50	27	I.*	Ec.	Dis.
	14	47		I.*	Oc.	Re.
6	8	56		I.	Sh.	In.
	9	36		I.	Tr.	In.
	11	14		I.*	Sh.	Eg.
	11	54		I.*	Tr.	Eg.
	17	2	23	II.	Ec.	Dis.
	21	8		II.	Oc.	Re.
7	6	18	55	I.	Ec.	Dis.
	9	14		I.	Oc.	Re.
	10	6		III.*	Sh.	In.
	12	41		III.*	Tr.	In.
	13	18		III.*	Sh.	Eg.
	15	58		III.	Tr.	Eg.
8	3	25		I.	Sh.	In.
	4	3		I.	Tr.	In.
	5	42		I.	Sh.	Eg.
	6	21		I.	Tr.	Eg.
	12	6		II.*	Sh.	In.
	13	21		II.*	Tr.	In.
	14	55		II.*	Sh.	Eg.
	16	11		II.	Tr.	Eg.
9	0	47	29	I.	Ec.	Dis.
	3	40		I.	Oc.	Re.
	11	40	52	IV.*	Ec.	Dis.
	14	7	37	IV.*	Ec.	Re.
	17	4		IV.	Oc.	Dis.
	19	56		IV.	Oc.	Re.
	21	53		I.	Sh.	In.
	22	29		I.	Tr.	In.
10	0	11		I.	Sh.	Eg.
	0	47		I.	Tr.	Eg.
10	6	19	49	II.	Ec.	Dis.
	10	17		II.*	Oc.	Re.
	19	15	56	I.	Ec.	Dis.
	22	6		I.	Oc.	Re.
11	0	24	0	III.	Ec.	Dis.
	5	52		III.	Oc.	Re.
	16	22		I.	Sh.	In.
	16	55		I.	Tr.	In.
	18	39		I.	Sh.	Eg.
	19	13		I.	Tr.	Eg.
12	1	24		II.	Sh.	In.
	2	30		II.	Tr.	In.
	4	13		II.	Sh.	Eg.
	5	20		II.	Tr.	Eg.
	13	44	29	I.*	Ec.	Dis.
	16	32		I.	Oc.	Re.
13	10	50		I.*	Sh.	In.
	11	21		I.*	Tr.	In.
	13	8		I.*	Sh.	Eg.
	13	39		I.*	Tr.	Eg.
	19	37	6	II.	Ec.	Dis.
	23	25		II.	Oc.	Re.
14	8	12	58	I.	Ec.	Dis.
	10	58		I.*	Oc.	Re.
	14	5		III.*	Sh.	In.
	16	2		III.*	Tr.	In.
	17	18		III.	Sh.	Eg.
	19	19		III.	Tr.	Eg.
15	5	19		I.	Sh.	In.
	5	47		I.	Tr.	In.
	7	36		I.	Sh.	Eg.
	8	5		I.	Tr.	Eg.
	14	42		II.*	Sh.	In.
	15	38		II.*	Tr.	In.
	17	31		II.	Sh.	Eg.
	18	28		II.	Tr.	Eg.
16	2	41	33	I.	Ec.	Dis.
	5	25		I.	Oc.	Re.
	23	47		I.	Sh.	In.
17	0	13		I.	Tr.	In.
	2	5		I.	Sh.	Eg.
	2	31		I.	Tr.	Eg.
	8	54	41	II.	Ec.	Dis.
	12	33		II.*	Oc.	Re.
	20	13		IV.	Sh.	In.
	21	10	2	I.	Ec.	Dis.
	22	46		IV.	Sh.	Eg.
	23	51		I.	Oc.	Re.
18	0	2		IV.	Tr.	In.
	2	52		IV.	Tr.	Eg.
	4	22	32	III.	Ec.	Dis.
	9	12		III.*	Oc.	Re.
	18	16		I.	Sh.	In.
	18	39		I.	Tr.	In.
	20	34		I.	Sh.	Eg.
	20	57		I.	Tr.	Eg.
19	4	0		II.	Sh.	In.
	4	46		II.	Tr.	In.
	6	49		II.	Sh.	Eg.
	7	36		II.	Tr.	Eg.
	15	38	35	I.*	Ec.	Dis.
	18	17		I.	Oc.	Re.
20	12	44		I.*	Sh.	In.
	13	5		I.*	Tr.	In.
20	15	2		I.*	Sh.	Eg.
	15	23		I.*	Tr.	Eg.
	22	12	4	II.	Ec.	Dis.
21	1	40		II.	Oc.	Re.
	10	7	6	I.*	Ec.	Dis.
	12	43		I.*	Oc.	Re.
	18	4		III.	Sh.	In.
	19	21		III.	Tr.	In.
	21	18		III.	Sh.	Eg.
	22	37		III.	Tr.	Eg.
22	7	13		I.	Sh.	In.
	7	31		I.	Tr.	In.
	9	31		I.*	Sh.	Eg.
	9	49		I.*	Tr.	Eg.
	17	17		II.	Sh.	In.
	17	53		II.	Tr.	In.
	20	7		II.	Sh.	Eg.
	20	43		II.	Tr.	Eg.
23	4	35	42	I.	Ec.	Dis.
	7	9		I.	Oc.	Re.
24	1	42		I.	Sh.	In.
	1	57		I.	Tr.	In.
	3	59		I.	Sh.	Eg.
	4	15		I.	Tr.	Eg.
	11	29	50	II.*	Ec.	Dis.
	14	47		II.*	Oc.	Re.
	23	4	13	I.	Ec.	Dis.
25	1	35		I.	Oc.	Re.
	8	21	6	III.	Ec.	Dis.
	12	29		III.*	Oc.	Re.
	20	10		I.	Sh.	In.
	20	23		I.	Tr.	In.
	22	28		I.	Sh.	Eg.
	22	41		I.	Tr.	Eg.
26	5	38	24	IV.	Ec.	Dis.
	6	35		II.	Sh.	In.
	7	1		II.	Tr.	In.
	9	25		II.*	Sh.	Eg.
	9	50		II.*	Tr.	Eg.
	10	23		IV.*	Oc.	Re.
	17	32	47	I.	Ec.	Dis.
	20	1		I.	Oc.	Re.
27	14	38		I.*	Sh.	In.
	14	49		I.*	Tr.	In.
	16	56		I.	Sh.	Eg.
	17	7		I.	Tr.	Eg.
28	0	47	19	II.	Ec.	Dis.
	3	55		II.	Oc.	Re.
	12	1	20	I.*	Ec.	Dis.
	14	27		I.*	Oc.	Re.
	22	3		III.	Sh.	In.
	22	38		III.	Tr.	In.
29	1	18		III.	Sh.	Eg.
	1	55		III.	Tr.	Eg.
	9	7		I.*	Sh.	In.
	9	15		I.*	Tr.	In.
	11	25		I.*	Sh.	Eg.
	11	33		I.*	Tr.	Eg.
	19	53		II.	Sh.	In.
	20	8		II.	Tr.	In.
	22	42		II.	Sh.	Eg.
	22	57		II.	Tr.	Eg.
30	6	29	57	I.	Ec.	Dis.
	8	53		I.*	Oc.	Re.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

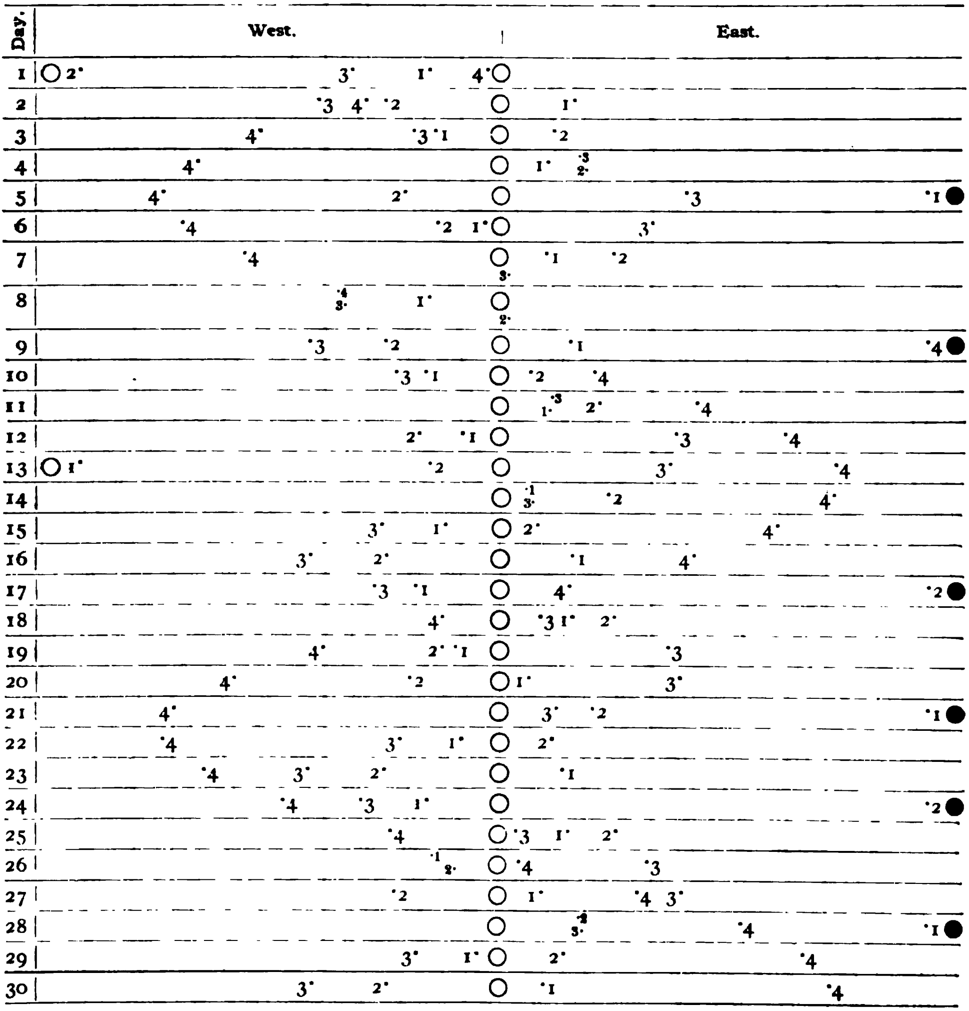
WASHINGTON MEAN TIME.

JUNE.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 12^h 30^m for an Inverting Telescope.



WASHINGTON MEAN TIME.

JULY.

d	h	m	s			
1	3	36		I.	Sh.	In.
	3	41		I.	Tr.	In.
	5	53		I.	Sh.	Eg.
	5	59		I.	Tr.	Eg.
	14	5	16	II.*	Ec.	Dis.
	17	2		II.	Oc.	Re.
2	0	58	29	I.	Ec.	Dis.
	3	18		I.	Oc.	Re.
	12	19	54	III.*	Ec.	Dis.
	15	45		III.*	Oc.	Re.
	22	4		I.	Sh.	In.
	22	7		I.	Tr.	In.
3	0	22		I.	Sh.	Eg.
	0	25		I.	Tr.	Eg.
	9	11		II.*	Sh.	In.
	9	15		II.*	Tr.	In.
	12	0		II.*	Sh.	Eg.
	12	5		II.*	Tr.	Eg.
	19	27	5	I.	Ec.	Dis.
	21	44		I.	Oc.	Re.
4	14	11		IV.*	Sh.	In.
	14	14		IV.*	Tr.	In.
	16	33		I.	Sh.	In.
	16	33		I.	Tr.	In.
	16	58		IV.	Sh.	Eg.
	17	4		IV.	Tr.	Eg.
	18	51		I.	Sh.	Eg.
	18	51		I.	Tr.	Eg.
5	3	19		II.	Oc.	Dis.
	6	9		II.	Oc.	Re.
	13	52		I.*	Oc.	Dis.
	16	10		I	Oc.	Re.
6	1	54		III.	Tr.	In.
	2	2		III.	Sh.	In.
	5	11		III.	Tr.	Eg.
	5	18		III.	Sh.	Eg.
	10	59		I.*	Tr.	In.
	11	1		I.*	Sh.	In.
	13	17		I.*	Tr.	Eg.
	13	19		I.*	Sh.	Eg.
	22	22		II.	Tr.	In.
	22	28		II.	Sh.	In.
7	1	12		II.	Tr.	Eg.
	1	18		II.	Sh.	Eg.
	8	18		I.	Oc.	Dis.
	10	37	36	I.*	Ec.	Re.
8	5	25		I.	Tr.	In.
	5	30		I.	Sh.	In.
	7	43		I.	Tr.	Eg.
	7	48		I.	Sh.	Eg.
	16	27		II.	Oc.	Dis.
	19	25	39	II.	Ec.	Re.
9	2	44		I.	Oc.	Dis.
	5	6	10	I.	Ec.	Re.
	15	45		III.*	Oc.	Dis.
	19	26	8	III.	Ec.	Re.
	23	51		I.	Tr.	In.
	23	59		I.	Sh.	In.
10	2	9		I.	Tr.	Eg.
	2	17		I.	Sh.	Eg.
	11	29		II.*	Tr.	In.
	11	46		II.*	Sh.	In.
	14	19		II.*	Tr.	Eg.
	14	36		II.*	Sh.	Eg.
	21	10		I.	Oc.	Dis.
	23	34	48	I.	Ec.	Re.
11	18	17		I.	Tr.	In.
	18	27		I.	Sh.	In.
	20	35		I.	Tr.	Eg.
	20	45		I.	Sh.	Eg.
12	5	34		II.	Oc.	Dis.
	8	43	32	II.*	Ec.	Re.
	15	36		I.	Oc.	Dis.
	18	3	23	I.	Ec.	Re.
	21	43		IV.	Oc.	Dis.
13	2	26	31	IV.	Ec.	Re.
	5	11		III.	Tr.	In.
	6	1		III.	Sh.	In.
	8	27		III.*	Tr.	Eg.
	9	18		III.*	Sh.	Eg.
	12	43		I.*	Tr.	In.
	12	56		I.*	Sh.	In.
	15	1		I.*	Tr.	Eg.
	15	14		I.*	Sh.	Eg.
14	0	36		II.	Tr.	In.
	1	4		II.	Sh.	In.
	3	26		II.	Tr.	Eg.
	3	54		II.	Sh.	Eg.
	10	2		I.*	Oc.	Dis.
	12	32	4	I.*	Ec.	Re.
15	7	9		I.	Tr.	In.
	7	24		I.	Sh.	In.
	9	27		I.*	Tr.	Eg.
	9	42		I.*	Sh.	Eg.
	18	42		II.	Oc.	Dis.
	22	1	59	II.	Ec.	Re.
16	4	28		I.	Oc.	Dis.
	7	0	39	I.	Ec.	Re.
	19	2		III.	Oc.	Dis.
	23	26	26	III.	Ec.	Re.
17	1	35		I.	Tr.	In.
	1	53		I.	Sh.	In.
	3	53		I.	Tr.	Eg.
	4	11		I.	Sh.	Eg.
	13	44		II.*	Tr.	In.
	14	22		II.*	Sh.	In.
	16	34		II.	Tr.	Eg.
	17	12		II.	Sh.	Eg.
	22	54		I.	Oc.	Dis.
18	1	29	18	I.	Ec.	Re.
	20	1		I.	Tr.	In.
	20	22		I.	Sh.	In.
	22	19		I.	Tr.	Eg.
	22	40		I.	Sh.	Eg.
19	7	49		II.	Oc.	Dis.
	11	19	57	II.*	Ec.	Re.
	17	20		I.	Oc.	Dis.
	19	57	55	I.	Ec.	Re.
20	8	29		III.*	Tr.	In.
	10	0		III.*	Sh.	In.
	11	45		III.*	Tr.	Eg.
	13	18		III.*	Sh.	Eg.
	14	27		I.*	Tr.	In.
	14	51		I.*	Sh.	In.
	16	45		I.	Tr.	Eg.
	17	9		I.	Sh.	Eg.
21	2	51		II.	Tr.	In.
	3	39		II.	Sh.	In.
	4	26		IV.	Tr.	In.
	5	41		II.	Tr.	Eg.
	6	29		II.	Sh.	Eg.
	7	17		IV.	Tr.	Eg.
21	8	14		IV.*	Sh.	In.
	11	12		IV.*	Sh.	Eg.
	11	46		I.*	Oc.	Dis.
	14	26	37	I.*	Ec.	Re.
22	8	54		I.*	Tr.	In.
	9	19		I.*	Sh.	In.
	11	12		I.*	Tr.	Eg.
	11	37		I.*	Sh.	Eg.
	20	58		II.	Oc.	Dis.
23	0	38	35	II.	Ec.	Re.
	6	13		I.	Oc.	Dis.
	8	55	14	I.*	Ec.	Re.
	22	22		III.	Oc.	Dis.
24	3	20		I.	Tr.	In.
	3	27	18	III.	Ec.	Re.
	3	48		I.	Sh.	In.
	5	38		I.	Tr.	Eg.
	6	6		I.	Sh.	Eg.
	15	59		II.	Tr.	In.
	16	57		II.	Sh.	In.
	18	49		II.	Tr.	Eg.
	19	47		II.	Sh.	Eg.
25	0	39		I.	Oc.	Dis.
	3	23	54	I.	Ec.	Re.
	21	46		I.	Tr.	In.
	22	17		I.	Sh.	In.
26	0	4		I.	Tr.	Eg.
	0	35		I.	Sh	Eg.
	10	6		II.*	Oc.	Dis.
	13	56	39	II.*	Ec.	Re.
	19	5		I.	Oc.	Dis.
	21	52	32	I.	Ec.	Re.
27	11	49		III.*	Tr.	In.
	14	0		III.*	Sh.	In.
	15	5		III.	Tr.	Eg.
	16	12		I.	Tr.	In.
	16	45		I.	Sh.	In.
	17	19		III.	Sh.	Eg.
	18	30		I.	Tr.	Eg.
	19	3		I.	Sh.	Eg.
28	5	8		II.	Tr.	In.
	6	15		II.	Sh.	In.
	7	57		II.*	Tr.	Eg.
	9	5		II.*	Sh.	Eg.
	13	31		I.*	Oc.	Dis.
	16	21	15	I.	Ec.	Re.
29	10	39		I.*	Tr.	In.
	11	14		I.*	Sh.	In.
	12	8		IV.*	Oc.	Dis.
	12	57		I.*	Tr.	Eg.
	13	32		I.*	Sh.	Eg.
	15	2		IV.	Oc.	Re.
	17	36	20	IV.	Ec.	Dis.
	20	36	26	IV.	Ec.	Re.
	23	15		II.	Oc.	Dis.
30	3	15	28	II.	Ec.	Re.
	7	58		I.*	Oc.	Dis.
	10	49	54	I.*	Ec.	Re.
31	1	43		III.	Oc.	Dis.
	5	5		I.	Tr.	In.
	5	43		I.	Sh.	In.
	7	23		I.	Tr.	Eg.
	7	27	37	III.	Ec.	Re.
	8	1		I.*	Sh.	Eg.
	18	16		II.	Tr.	In.
	19	32		II.	Sh.	In.
	21	6		II.	Tr.	Eg.
	22	23		II.	Sh.	Eg.

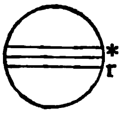
NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

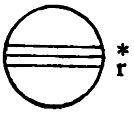
JULY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

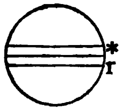
I.



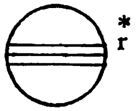
III.



II.



IV.



Configurations at 11ʰ 30ᵐ for an Inverting Telescope.

Day.	West.		East.
1	·3 1· ·2	O	4·
2	·3	O	·1 ·2 4·
3	O 2· ·1	O	·3 4·
4	·2	O	4· 1· 3·
5	4· ·1	O	·2 3·
6	O 1· 4· 3·	O	2·
7	4· 3· 2·	O	·1
8	4· ·3 ·2 1·	O	
9	·4 ·3	O	·1 ·2
10	O 2· ·4 1·	O	·3
11	·4 ·2	O	1· ·3
12	·4 ·1	O	·2 3·
13	3·	O	1· ·4 2·
14	3· 2·	O	·4 ·1 ●
15	·3 ·2 1·	O	·4
16	·3	O	·1 ·2 ·4
17	1·	O	2· ·3 4·
18	2·	O	1· ·3 4·
19	·1	O	·2 3· 4·
20	O 3·	O	1· 2· 4·
21	3· 2· 4· ·1	O	
22	·3 4· ·2 1·	O	
23	4· ·3	O	·1 ·2
24	4· 1·	O	2· ·3
25	·4 2·	O	·1 ·3
26	·4 ·1	O	3· ·2 ●
27	·4	O 3·	1· 2·
28	·4 3· 2· ·1	O	
29	O 1· ·3 ·2	·4 O	
30	·3	O	·1 ·2 ·4
31	1·	O	·3 2· ·4

WASHINGTON MEAN TIME.

AUGUST.

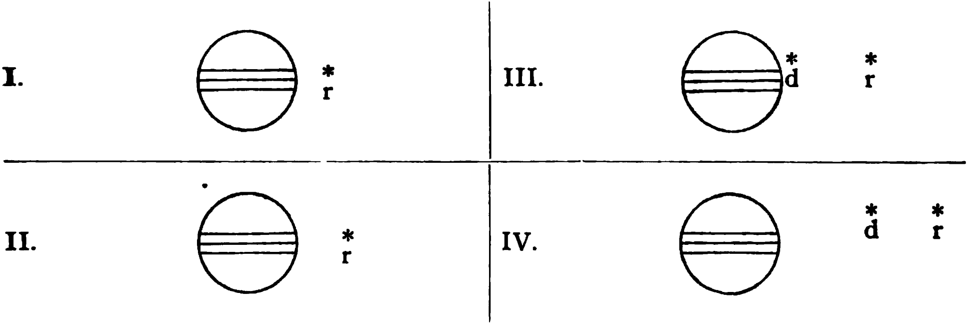
d	h	m	s			
1	2	24		I.	Oc.	Dis.
	5	18	35	I.	Ec.	Re.
	23	32		I.	Tr.	In.
2	0	12		I.	Sh.	In.
	1	50		I.	Tr.	Eg.
	2	30		I.	Sh.	Eg.
	12	24		II.*	Oc.	Dis.
	16	33	38	II.	Ec.	Re.
	20	51		I.	Oc.	Dis.
	23	47	14	I.	Ec.	Re.
3	15	12		III.	Tr.	In.
	17	58		I.	Tr.	In.
	18	0		III.	Sh.	In.
	18	27		III.	Tr.	Eg.
	18	40		I.	Sh.	In.
	20	16		I.	Tr.	Eg.
	20	59		I.	Sh.	Eg.
	21	20		III.	Sh.	Eg.
4	7	25		II.	Tr.	In.
	8	50		II.*	Sh.	In.
	10	15		II.*	Tr.	Eg.
	11	40		II.*	Sh.	Eg.
	15	17		I.	Oc.	Dis.
	18	15	58	I.	Ec.	Re.
5	12	25		I.*	Tr.	In.
	13	9		I.*	Sh.	In.
	14	43		I.	Tr.	Eg.
	15	27		I.	Sh.	Eg.
6	1	34		II.	Oc.	Dis.
	5	52	35	II.	Ec.	Re.
	9	44		I.*	Oc.	Dis.
	12	44	38	I.*	Ec.	Re.
	19	4		IV.	Tr.	In.
	21	57		IV.	Tr.	Eg.
7	2	16		IV.	Sh.	In.
	5	7		III.	Oc.	Dis.
	5	25		IV.	Sh.	Eg.
	6	51		I.	Tr.	In.
	7	38		I.*	Sh.	In.
	9	9		I.*	Tr.	Eg.
	9	56		I.*	Sh.	Eg.
	11	27	55	III.*	Ec.	Re.
	20	34		II.	Tr.	In.
	22	8		II.	Sh.	In.
	23	24		II.	Tr.	Eg.
8	0	58		II.	Sh.	Eg.
	4	10		I.	Oc.	Dis.
	7	13	21	I.	Ec.	Re.
9	1	18		I.	Tr.	In.
	2	7		I.	Sh.	In.
	3	36		I.	Tr.	Eg.
	4	25		I.	Sh.	Eg.
	14	43		II.	Oc.	Dis.
	19	10	51	II.	Ec.	Re.
	22	37		I.	Oc.	Dis.
10	1	42	1	I.	Ec.	Re.
	18	38		III.	Tr.	In.
	19	45		I.	Tr.	In.
	20	35		I.	Sh.	In.
	21	54		III.	Tr.	Eg.
	22	0		III.	Sh.	In.
	22	3		I.	Tr.	Eg.
	22	54		I.	Sh.	Eg.
11	1	21		III.	Sh.	Eg.
	9	44		II.*	Tr.	In.
	11	26		II.*	Sh.	In.
11	12	34		II.*	Tr.	Eg.
	14	16		II.	Sh.	Eg.
	17	4		I.	Oc.	Dis.
	20	10	46	I.	Ec.	Re.
12	14	12		I.	Tr.	In.
	15	4		I.	Sh.	In.
	16	30		I.	Tr.	Eg.
	17	22		I.	Sh.	Eg.
13	3	54		II.	Oc.	Dis.
	8	29	57	II.*	Ec.	Re.
	11	30		I.*	Oc.	Dis.
	14	39	27	I.	Ec.	Re.
14	8	35		III.*	Oc.	Dis.
	8	39		I.*	Tr.	In.
	9	33		I.*	Sh.	In.
	10	57		I.*	Tr.	Eg.
	11	51		I.*	Sh.	Eg.
	11	51		III.*	Oc.	Re.
	12	16	48	III.*	Ec.	Dis.
	15	28	14	III.	Ec.	Re.
	22	54		II.	Tr.	In.
15	0	43		II.	Sh.	In.
	1	44		II.	Tr.	Eg.
	3	11		IV.	Oc.	Dis.
	3	34		II.	Sh.	Eg.
	5	57		I.	Oc.	Dis.
	6	6		IV.	Oc.	Re.
	9	8	10	I.*	Ec.	Re.
	11	37	45	IV.*	Ec.	Dis.
	14	47	19	IV.	Ec.	Re.
16	3	6		I.	Tr.	In.
	4	2		I.	Sh.	In.
	5	24		I.	Tr.	Eg.
	6	20		I.	Sh.	Eg.
	17	5		II.	Oc.	Dis.
	21	48	18	II.	Ec.	Re.
17	0	24		I.	Oc.	Dis.
	3	36	52	I.	Ec.	Re.
	21	33		I.	Tr.	In.
	22	9		III.	Tr.	In.
	22	31		I.	Sh.	In.
	23	51		I.	Tr.	Eg.
18	0	49		I.	Sh.	Eg.
	1	25		III.	Tr.	Eg.
	2	1		III.	Sh.	In.
	5	22		III.	Sh.	Eg.
	12	5		II.*	Tr.	In.
	14	1		II.	Sh.	In.
	14	55		II.	Tr.	Eg.
	16	52		II.	Sh.	Eg.
	18	51		I.	Oc.	Dis.
	22	5	37	I.	Ec.	Re.
19	16	0		I.	Tr.	In.
	16	59		I.	Sh.	In.
	18	18		I.	Tr.	Eg.
	19	18		I.	Sh.	Eg.
20	6	17		II.	Oc.	Dis.
	11	7	33	II.*	Ec.	Re.
	13	18		I.	Oc.	Dis.
	16	34	20	I.	Ec.	Re.
21	10	27		I.*	Tr.	In.
	11	28		I.*	Sh.	In.
	12	7		III.*	Oc.	Dis.
	12	45		I.*	Tr.	Eg.
	13	46		I.	Sh.	Eg.
	15	23		III.	Oc.	Re.
21	16	16	25	III.	Ec.	Dis.
	19	28	44	III.	Ec.	Re.
22	1	16		II.	Tr.	In.
	3	18		II.	Sh.	In.
	4	6		II.	Tr.	Eg.
	6	9		II.	Sh.	Eg.
	7	45		I.*	Oc.	Dis.
	11	3	4	I.*	Ec.	Re.
23	4	54		I.	Tr.	In.
	5	57		I.	Sh.	In.
	7	12		I.*	Tr.	Eg.
	8	15		I.*	Sh.	Eg.
	10	28		IV.*	Tr.	In.
	13	24		IV.	Tr.	Eg.
	19	29		II.	Oc.	Dis.
	20	20		IV.	Sh.	In.
	23	38		IV.	Sh.	Eg.
24	0	25	58	II.	Ec.	Re.
	2	13		I.	Oc.	Dis.
	5	31	46	I.	Ec.	Re.
	23	22		I.	Tr.	In.
25	0	26		I.	Sh.	In.
	1	40		I.	Tr.	Eg.
	1	44		III.	Tr.	In.
	2	44		I.	Sh.	Eg.
	5	0		III.	Tr.	Eg.
	6	1		III.	Sh.	In.
	9	23		III.*	Sh.	Eg.
	14	28		II.	Tr.	In.
	16	36		II.	Sh.	In.
	17	18		II.	Tr.	Eg.
	19	27		II.	Sh.	Eg.
	20	40		I.	Oc.	Dis.
26	0	0	32	I.	Ec.	Re.
	17	49		I.	Tr.	In.
	18	55		I.	Sh.	In.
	20	7		I.	Tr.	Eg.
	21	13		I.	Sh.	Eg.
27	8	42		II.*	Oc.	Dis.
	13	45	20	II.	Ec.	Re.
	15	7		I.	Oc.	Dis.
	18	29	16	I.	Ec.	Re.
28	12	17		I.*	Tr.	In.
	13	23		I.	Sh.	In.
	14	35		I.	Tr.	Eg.
	15	42		I.	Sh.	Eg.
	15	44		III.	Oc.	Dis.
	19	0		III.	Oc.	Re.
	20	16	42	III	Ec.	Dis.
	23	29	53	III.	Ec.	Re.
29	3	41		II.	Tr.	In.
	5	54		II.	Sh.	In.
	6	31		II.	Tr.	Eg.
	8	45		II.*	Sh.	Eg.
	9	35		I.*	Oc.	Dis.
	12	58	0	I.	Ec.	Re.
30	6	44		I.	Tr.	In.
	7	52		I.*	Sh.	In.
	9	2		I.*	Tr.	Eg.
	10	11		I.*	Sh.	Eg.
	21	55		II.	Oc.	Dis.
31	3	3	49	II.	Ec.	Re.
	4	2		I.	Oc.	Dis.
	7	26	43	I.*	Ec.	Re.
	19	3		IV.	Oc.	Dis.
	22	2		IV.	Oc.	Re.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

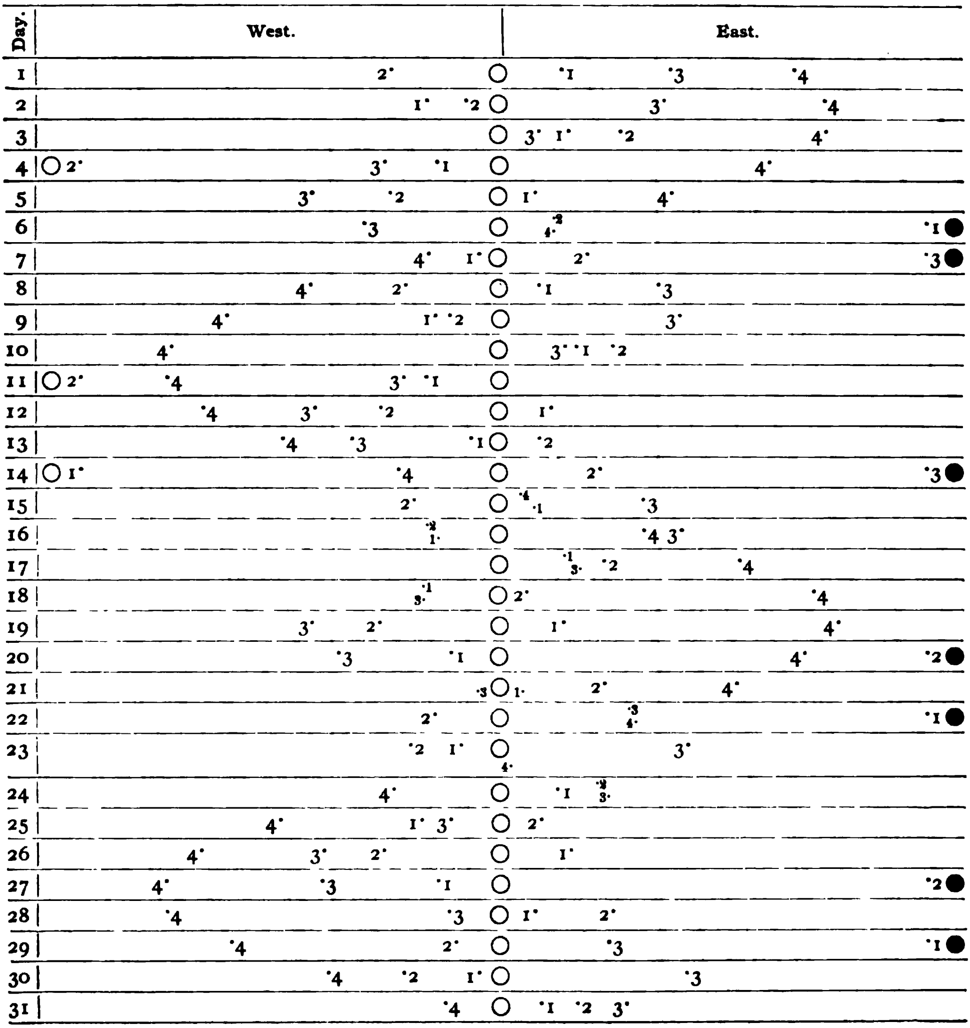
WASHINGTON MEAN TIME.

AUGUST.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 10ʰ 0ᵐ for an Inverting Telescope.



WASHINGTON MEAN TIME.

SEPTEMBER.

d	h	m	s			
1	1	12		I.	Tr.	In.
	2	21		I.	Sh.	In.
	3	30		I.	Tr.	Eg.
	4	40		I.	Sh.	Eg.
	5	23		III.	Tr.	In.
	5	39	26	IV.	Ec.	Dis.
	8	39		III.*	Tr.	Eg.
	8	57	53	IV.*	Ec.	Re.
	10	1		III.*	Sh.	In.
	13	24		III.	Sh.	Eg.
	16	54		II.	Tr.	In.
	19	11		II.	Sh.	In.
	19	44		II.	Tr.	Eg.
	22	3		II.	Sh.	Eg.
	22	30		I.	Oc.	Dis.
2	1	55	30	I.	Ec.	Re.
	19	40		I.	Tr.	In.
	20	50		I.	Sh.	In.
	21	58		I.	Tr.	Eg.
	23	9		I.	Sh.	Eg.
3	11	10		II.*	Oc.	Dis.
	16	23	18	II.	Ec.	Re.
	16	57		I.	Oc.	Dis.
	20	24	15	I.	Ec.	Re.
4	14	8		I.	Tr.	In.
	15	19		I.	Sh.	In.
	16	26		I.	Tr.	Eg.
	17	37		I.	Sh.	Eg.
	19	25		III.	Oc.	Dis.
	22	42		III.	Oc.	Re.
5	0	16	45	III.	Ec.	Dis.
	3	30	48	III.	Ec.	Re.
	6	7		II.	Tr.	In.
	8	29		II.*	Sh.	In.
	8	57		II.*	Tr.	Eg.
	11	20		II.*	Sh.	Eg.
	11	25		I.*	Oc.	Dis.
	14	53	0	I.	Ec.	Re.
6	8	36		I.*	Tr.	In.
	9	48		I.*	Sh.	In.
	10	54		I.*	Tr.	Eg.
	12	6		I.	Sh.	Eg.
7	0	24		II.	Oc.	Dis.
	5	41	50	II.	Ec.	Re.
	5	53		I.	Oc.	Dis.
	9	21	43	I.*	Ec.	Re.
8	3	4		I.	Tr.	In.
	4	17		I.	Sh.	In.
	5	22		I.	Tr.	Eg.
	6	35		I.	Sh.	Eg.
	9	6		III.*	Tr.	In.
	12	22		III.	Tr.	Eg.
	14	0		III.	Sh.	In.
	17	24		III.	Sh.	Eg.
	19	21		II.	Tr.	In.
	21	47		II.	Sh.	In.
	22	11		II.	Tr.	Eg.
9	0	21		I.	Oc.	Dis.
	0	38		II.	Sh.	Eg.
	2	49		IV.	Tr.	In.
	3	50	30	I.	Ec.	Re.
	5	49		IV.	Tr.	Eg.
	14	25		IV.	Sh.	In.
	17	53		IV.	Sh.	Eg.
	21	32		I.	Tr.	In.
	22	46		I.	Sh.	In.
9	23	50		I.	Tr.	Eg.
10	1	4		I.	Sh.	Eg.
	13	40		II.	Oc.	Dis.
	18	49		I.	Oc.	Dis.
	19	1	24	II.	Ec.	Re.
	22	19	16	I.	Ec.	Re.
11	16	0		I.	Tr.	In.
	17	15		I.	Sh.	In.
	18	18		I.	Tr.	Eg.
	19	33		I.	Sh.	Eg.
	23	11		III.	Oc.	Dis.
12	2	28		III.	Oc.	Re.
	4	17	16	III.	Ec.	Dis.
	7	32	10	III.*	Ec.	Re.
	8	36		II.*	Tr.	In.
	11	4		II.*	Sh.	In.
	11	26		II.	Tr.	Eg.
	13	17		I.	Oc.	Dis.
	13	56		II.	Sh.	Eg.
	16	48	1	I.	Ec.	Re.
13	10	28		I.*	Tr.	In.
	11	43		I.	Sh.	In.
	12	46		I.	Tr.	Eg.
	14	2		I.	Sh.	Eg.
14	2	56		II.	Oc.	Dis.
	7	45		I.*	Oc.	Dis.
	8	19	59	II.*	Ec.	Re.
	11	16	45	I.	Ec.	Re.
15	4	56		I.	Tr.	In.
	6	12		I.	Sh.	In.
	7	14		I.*	Tr.	Eg.
	8	31		I.*	Sh.	Eg.
	12	54		III.	Tr.	In.
	16	11		III.	Tr.	Eg.
	18	1		III.	Sh.	In.
	21	26		III.	Sh.	Eg.
	21	51		II.	Tr.	In.
16	0	22		II.	Sh.	In.
	0	41		II.	Tr.	Eg.
	2	13		I.	Oc.	Dis.
	3	13		II.	Sh.	Eg.
	5	45	32	I.	Ec.	Re.
	23	24		I.	Tr.	In.
17	0	41		I.	Sh.	In.
	1	42		I.	Tr.	Eg.
	3	0		I.	Sh.	Eg.
	11	53		IV.	Oc.	Dis.
	14	57		IV.	Oc.	Re.
	16	13		II.	Oc.	Dis.
	20	41		I.	Oc.	Dis.
	21	39	38	II.	Ec.	Re.
	23	42	0	IV.	Ec.	Dis.
18	0	14	18	I.	Ec.	Re.
	3	8	44	IV.	Ec.	Re.
	17	53		I.	Tr.	In.
	19	10		I.	Sh.	In.
	20	11		I.	Tr.	Eg.
	21	29		I.	Sh.	Eg.
19	3	2		III.	Oc.	Dis.
	6	19		III.	Oc.	Re.
	8	17	13	III.*	Ec.	Dis.
	11	7		II.	Tr.	In.
	11	32	56	III.	Ec.	Re.
	13	40		II.	Sh.	In.
	13	57		II.	Tr.	Eg.
	15	9		I.	Oc.	Dis.
19	16	31		II.	Sh.	Eg.
	18	43	3	I.	Ec.	Re.
20	12	21		I.	Tr.	In.
	13	39		I.	Sh.	In.
	14	39		I.	Tr.	Eg.
	15	58		I.	Sh.	Eg.
21	5	30		II.	Oc.	Dis.
	9	38		I.*	Oc.	Dis.
	10	58	14	II.	Ec.	Re.
	13	11	48	I.	Ec.	Re.
22	6	50		I.*	Tr.	In.
	8	8		I.*	Sh.	In.
	9	8		I.*	Tr.	Eg.
	10	27		I.*	Sh.	Eg.
	16	48		III.	Tr.	In.
	20	6		III.	Tr.	Eg.
	22	2		III.	Sh.	In.
23	0	23		II.	Tr.	In.
	1	28		III.	Sh.	Eg.
	2	57		II.	Sh.	In.
	3	13		II.	Tr.	Eg.
	4	6		I.	Oc.	Dis.
	5	49		II.	Sh.	Eg.
	7	40	35	I.*	Ec.	Re.
24	1	18		I.	Tr.	In.
	2	37		I.	Sh.	In.
	3	36		I.	Tr.	Eg.
	4	56		I.	Sh.	Eg.
	18	48		II.	Oc.	Dis
	22	35		I.	Oc.	Dis.
25	0	17	57	II.	Ec.	Re.
	2	9	21	I.	Ec.	Re.
	19	47		I.	Tr.	In.
	20	8		IV.	Tr.	In.
	21	6		I.	Sh.	In.
	22	5		I.	Tr.	Eg.
	23	15		IV.	Tr.	Eg.
	23	24		I.	Sh.	Eg.
26	6	57		III.*	Oc.	Dis.
	8	30		IV.*	Sh.	In.
	10	15		III.*	Oc.	Re.
	12	7		IV.	Sh.	Eg.
	12	17	4	III.	Ec.	Dis
	13	40		II.	Tr.	In.
	15	33	36	III.	Ec.	Re.
	16	15		II.	Sh.	In.
	16	30		II.	Tr.	Eg.
	17	3		I.	Oc.	Dis.
	19	6		II.	Sh.	Eg.
	20	38	7	I.	Ec.	Re.
27	14	16		I.	Tr.	In.
	15	35		I.	Sh.	In.
	16	34		I.	Tr.	Eg.
	17	53		I.	Sh.	Eg.
28	8	6		II.*	Oc.	Dis.
	11	32		I.	Oc.	Dis.
	13	36	35	II.	Ec.	Re.
	15	6	52	I.	Ec.	Re.
29	8	45		I.*	Tr.	In.
	10	4		I.*	Sh.	In.
	11	3		I.	Tr.	Eg.
	12	22		I.	Sh.	Eg.
	20	46		III.	Tr.	In.
30	0	4		III.	Tr.	Eg.
	2	2		III.	Sh.	In.
	2	57		II.	Tr.	In.
	5	29		III.	Sh.	Eg.
	5	32		II.	Sh.	In.
	5	48		II.	Tr.	Eg.
	6	0		I.	Oc.	Dis.
	8	24		II.*	Sh.	Eg.
	9	35	38	I.*	Ec.	Re.

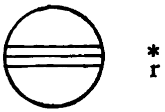
Note.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

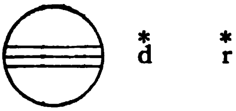
SEPTEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

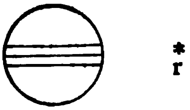
I.



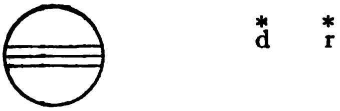
III.



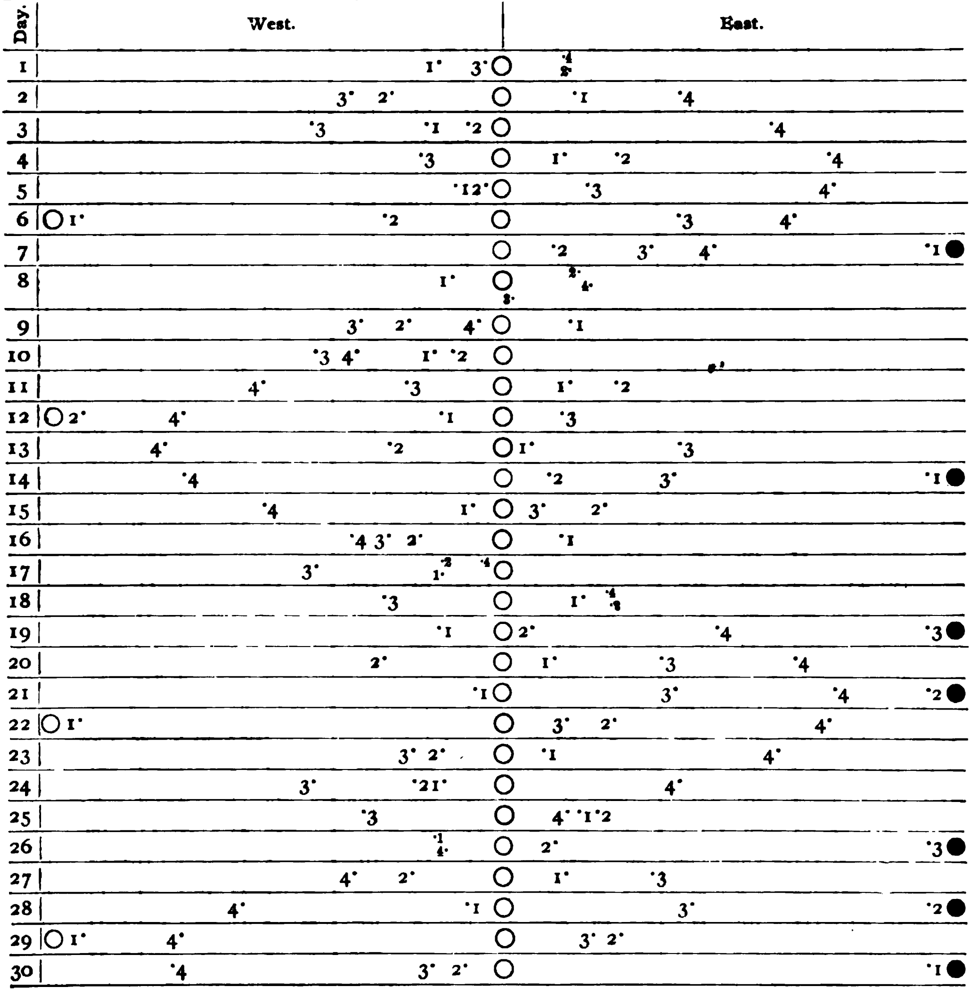
II.



IV.



Configurations at 9^{h} 0^{m} for an Inverting Telescope.



WASHINGTON MEAN TIME.

OCTOBER.

d	h	m	s				d	h	m	s				d	h	m	s			
1	3	13		I.	Tr.	In.	10	21	42		II.	Tr.	Eg.	21	9	3		III.*	Tr.	In.
	4	32		I.	Sh.	In.		23	34	59	III.	Ec.	Re.		10	50		II.	Tr.	In.
	5	32		I.	Tr.	Eg.	11	0	17		II.	Sh.	Eg.		11	49		I.	Oc.	Dis.
	6	51		I.*	Sh.	Eg.		0	28	14	I.	Ec.	Re.		11	49	25	IV.	Ec.	Dis.
	21	25		II.	Oc.	Dis.		18	8		I.	Tr.	In.		12	23		III.	Tr.	Eg.
2	0	29		I.	Oc.	Dis.		19	26		I.	Sh.	In.		13	18		II.	Sh.	In.
	2	56	20	II.	Ec.	Re.		20	26		I.	Tr.	Eg.		13	41		II.	Tr.	Eg.
	4	4	25	I.	Ec.	Re.		21	45		I.	Sh.	Eg.		14	4		III.	Sh.	In.
	21	42		I.	Tr.	In.	12	13	24		II.	Oc.	Dis.		15	20	48	I.	Ec.	Re.
	23	1		I.	Sh.	In.		14	22		IV.	Tr.	In.		15	31	7	IV.	Ec.	Re.
3	0	1		I.	Tr.	Eg.		15	23		I.	Oc.	Dis.		16	10		II.	Sh.	Eg.
	1	20		I.	Sh.	Eg.		17	37		IV.	Tr.	Eg.		17	33		III.	Sh.	Eg.
	10	56		III.	Oc.	Dis.		18	53	25	II.	Ec.	Re.	22	9	5		I.	Tr.	In.
	14	15		III.	Oc.	Re.		18	56	59	I.	Ec.	Re.		10	19		I.	Sh.	In.
	16	15		II.	Tr.	In.	13	2	30		IV.	Sh.	In.		11	23		I.	Tr.	Eg.
	16	16	54	III.	Ec.	Dis.		6	20		IV.*	Sh.	Eg.		12	38		I.	Sh.	Eg.
	18	50		II.	Sh.	In.		12	37		I.	Tr.	In.	23	5	29		II.	Oc.	Dis.
	18	58		I.	Oc.	Dis.		13	55		I.	Sh.	In.		6	19		I.*	Oc.	Dis.
	19	5		II.	Tr.	Eg.		14	55		I.	Tr.	Eg.		9	49	35	I.	Ec.	Re.
	19	34	14	III.	Ec.	Re.		16	14		I.	Sh.	Eg.		10	51	36	II.	Ec.	Re.
	21	42		II.	Sh.	Eg.	14	4	54		III.	Tr.	In.	24	3	34		I.	Tr.	In.
	22	33	11	I.	Ec.	Re.		8	10		II.*	Tr.	In.		4	48		I.	Sh.	In.
4	5	39		IV.	Oc.	Dis.		8	14		III.*	Tr.	Eg.		5	53		I.*	Tr.	Eg.
	8	51		IV.*	Oc.	Re.		9	52		I.	Oc.	Dis.		7	7		I.*	Sh.	Eg.
	16	11		I.	Tr.	In.		10	4		III.	Sh.	In.		23	17		III.	Oc.	Dis.
	17	30		I.	Sh.	In.		10	43		II.	Sh.	In.	25	0	10		II.	Tr.	In.
	17	45	51	IV.	Ec.	Dis.		11	1		II.	Tr.	Eg.		0	48		I.	Oc.	Dis.
	18	30		I.	Tr.	Eg.		13	25	46	I.	Ec.	Re.		2	36		II.	Sh.	In.
	19	49		I.	Sh.	Eg.		13	32		III.	Sh.	Eg.		2	38		III.	Oc.	Re.
	21	20	18	IV.	Ec.	Re.		13	35		II.	Sh.	Eg.		3	1		II.	Tr.	Eg.
5	10	44		II.	Oc.	Dis.	15	7	7		I.*	Tr.	In.		4	17	42	III.	Ec.	Dis.
	13	27		I.	Oc.	Dis.		8	24		I.*	Sh.	In.		4	18	19	I.	Ec.	Re.
	16	14	59	II.	Ec.	Re.		9	25		I.	Tr.	Eg.		5	28		II.	Sh.	Eg.
	17	1	56	I.	Ec.	Re.		10	43		I.	Sh.	Eg.		7	37	18	III.*	Ec.	Re.
6	10	40		I.	Tr.	In.	16	2	46		II.	Oc.	Dis.		22	4		I.	Tr.	In.
	11	59		I.	Sh.	In.		4	21		I.	Oc.	Dis.		23	17		I.	Sh.	In.
	12	59		I.	Tr.	Eg.		7	54	32	I.*	Ec.	Re.	26	0	22		I.	Tr.	Eg.
	14	18		I.	Sh.	Eg.		8	13	12	II.*	Ec.	Re.		1	36		I.	Sh.	Eg.
7	0	48		III.	Tr.	In.	17	1	36		I.	Tr.	In.		18	51		II.	Oc.	Dis.
	4	7		III.	Tr.	Eg.		2	53		I.	Sh.	In.		19	18		I.	Oc.	Dis.
	5	33		II.	Tr.	In.		3	54		I.	Tr.	Eg.		22	47	4	I.	Ec.	Re.
	6	3		III.*	Sh.	In.		5	12		I.	Sh.	Eg.	27	0	10	14	II.	Ec.	Re.
	7	56		I.*	Oc.	Dis.		19	6		III.	Oc.	Dis.		16	33		I.	Tr.	In.
	8	8		II.*	Sh.	In.		21	30		II.	Tr.	In.		17	46		I.	Sh.	In.
	8	23		II.*	Tr.	Eg.		22	27		III.	Oc.	Re.		18	52		I.	Tr.	Eg.
	9	31		III.*	Sh.	Eg.		22	51		I.	Oc.	Dis.		20	5		I.	Sh.	Eg.
	10	59		II.	Sh.	Eg.	18	0	0		II.	Sh.	In.	28	13	15		III.	Tr.	In.
	11	30	43	I.	Ec.	Re.		0	17	27	III.	Ec.	Dis.		13	31		II.	Tr.	In.
8	5	9		I.	Tr.	In.		0	21		II.	Tr.	Eg.		13	47		I.	Oc.	Dis.
	6	28		I.*	Sh.	In.		2	23	17	I.	Ec.	Re.		15	53		II.	Sh.	In.
	7	28		I.*	Tr.	Eg.		2	52		II.	Sh.	Eg.		16	22		II.	Tr.	Eg.
	8	47		I.*	Sh.	Eg.		3	36	19	III.	Ec.	Re.		16	37		III.	Tr.	Eg.
9	0	4		II.	Oc.	Dis.		20	5		I.	Tr.	In.		17	15	49	I.	Ec.	Re.
	2	25		I.	Oc.	Dis.		21	21		I.	Sh.	In.		18	5		III.	Sh.	In.
	5	34	45	II.	Ec.	Re.		22	24		I.	Tr.	Eg.		18	45		II.	Sh.	Eg.
	5	59	29	I.	Ec.	Re.		23	40		I.	Sh.	Eg.		21	34		III.	Sh.	Eg.
	23	39		I.	Tr.	In.	19	16	7		II.	Oc.	Dis.	29	9	25		IV.	Tr.	In.
10	0	57		I.	Sh.	In.		17	20		I.	Oc.	Dis.		11	3		I.	Tr.	In.
	1	57		I.	Tr.	Eg.		20	52	2	I.	Ec.	Re.		12	15		I.	Sh.	In.
	3	16		I.	Sh.	Eg.		21	31	51	II.	Ec.	Re.		12	48		IV.	Tr.	Eg.
	14	59		III.	Oc.	Dis.	20	14	35		I.	Tr.	In.		13	22		I.	Tr.	Eg.
	18	18		III.	Oc.	Re.		15	50		I.	Sh.	In.		14	34		I.	Sh.	Eg.
	18	51		II.	Tr.	In.		16	53		I.	Tr.	Eg.		20	43		IV.	Sh.	In.
	20	16	52	III.	Ec.	Dis.		18	9		I.	Sh.	Eg.	30	0	35		IV.	Sh.	Eg.
	20	54		I.	Oc.	Dis.	21	0	16		IV.	Oc.	Dis.		8	14		II.*	Oc.	Dis.
	21	25		II.	Sh.	In.		3	35		IV.	Oc.	Re.		8	17		I.*	Oc.	Dis.
															11	44	36	I.	Ec.	Re.
															13	29	59	II.	Ec.	Re.
														31	5	33		I.*	Tr.	In.
															6	44		I.*	Sh.	In.
															7	51		I.*	Tr.	Eg.
															9	3		I.	Sh.	Eg.

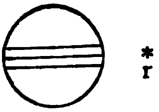
NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

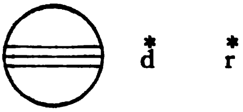
OCTOBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

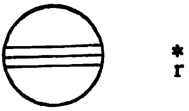
I.



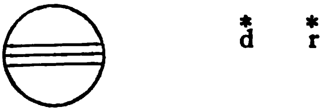
III.



II.



IV.



Configurations at 7h 30m for an Inverting Telescope.

Day.	West.		East.
1	·4 3· ·2 1·	○	·
2	·4 ·3	○	·2 ·1
3	·4 1· ·3	○	2·
4	2·	○	1· ·3 ·4●
5	·1 ·2	○	·4 ·3
6		○	1· ·2 3· ·4
7	○2· 3··1	○	·4
8	3· ·2 1·	○	·4
9	·3	○	·1·2 4·
10	·3 1·	○	2· 4·
11	2·	○	·1 ·3 4·
12	·2 ·1	○	4· ·3
13	4·	○	1· ·2 3·
14	○3· 4· ·1	○	2·
15	○1· 4· 3· ·2	○	
16	4· ·3	○	·1● ·2●
17	·4 ·3 1·	○	2·
18	·4 2·	○	·3 ·1
19	·4 ·2 1·	○	·3
20	·4	○	1· ·2 3·
21	·1	○	·4 3·2·
22	2· 3·	○	1· ·4
23	·3	○	·4 ·1● ·2●
24	·3 1·	○	2· ·4
25	2·	○	·1 4· ·3●
26	·21·	○	·3 4·
27		○	1· ·2 3· 4·
28	·1	○	3·2· 4·
29	2· 3·	○	4· 1·
30	3· 4· ·2 ·1	○	
31	○1· 4· ·3	○	2·

WASHINGTON MEAN TIME.

NOVEMBER.

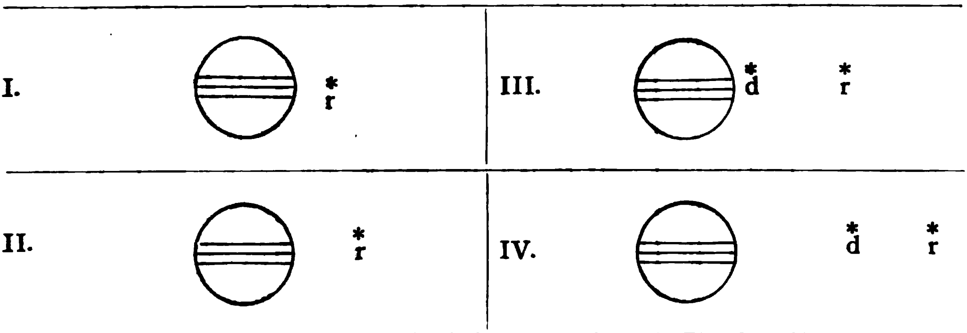
d	h	m	s				d	h	m	s				d	h	m	s			
1	2	46		I.	Oc.	Dis.	10	20	33		I.	Tr.	In.	20	14	15		I.	Oc.	Dis.
	2	52		II.	Tr.	In.		21	37		I.	Sh.	In.		16	36		II.	Oc.	Dis.
	3	31		III.	Oc.	Dis.		22	51		I.	Tr.	Eg.		17	29	28	I.	Ec.	Re.
	5	11		II.	Sh.	In.		23	56		I.	Sh.	Eg.		21	24	36	II.	Ec.	Re.
	5	43		II.*	Tr.	Eg.	11	17	45		I.	Oc.	Dis.	21	11	33		I.	Tr.	In.
	6	13	20	I.*	Ec.	Re.		18	57		II.	Tr.	In.		12	30		I.	Sh.	In.
	6	54		III.*	Oc.	Re.		21	4		II.	Sh.	In.		13	52		I.	Tr.	Eg.
	8	3		II.*	Sh.	Eg.		21	5	47	I.	Ec.	Re.		14	50		I.	Sh.	Eg.
	8	18	19	III.*	Ec.	Dis.		21	49		II.	Tr.	Eg.	22	8	45		I.	Oc.	Dis.
	11	38	39	III.	Ec.	Re.		21	49		III.	Tr.	In.		11	5		II.	Tr.	In.
2	0	3		I.	Tr.	In.		23	56		II.	Sh.	Eg.		11	58	10	I.	Ec.	Re.
	1	13		I.	Sh.	In.	12	1	13		III.	Tr.	Eg.		12	57		II.	Sh.	In.
	2	21		I.	Tr.	Eg.		2	6		III.	Sh.	In.		13	57		II.	Tr.	Eg.
	3	32		I.	Sh.	Eg.		5	37		III.*	Sh.	Eg.		15	49		II.	Sh.	Eg.
	21	16		I.	Oc.	Dis.		15	3		I.	Tr.	In.		16	28		III.	Oc.	Dis.
	21	36		II.	Oc.	Dis.		16	6		I.	Sh.	In.		19	54		III.	Oc.	Re.
3	0	42	4	I.	Ec.	Re.		17	21		I.	Tr.	Eg.		20	17	57	III.	Ec.	Dis.
	2	48	36	II.	Ec.	Re.		18	25		I.	Sh.	Eg.		23	40	22	III.	Ec.	Re.
	18	33		I.	Tr.	In.	13	12	15		I.	Oc.	Dis.	23	6	3		I.*	Tr.	In.
	19	42		I.	Sh.	In.		13	47		II.	Oc.	Dis.		6	59		I.*	Sh.	In.
	20	51		I.	Tr.	Eg.		15	34	32	I.	Ec.	Re.		8	22		I.	Tr.	Eg.
	22	1		I.	Sh.	Eg.		18	46	30	II.	Ec.	Re.		9	19		I.	Sh.	Eg.
4	15	46		I.	Oc.	Dis.	14	9	33		I.	Tr.	In.		15	26		IV.	Oc.	Dis.
	16	14		II.	Tr.	In.		10	35		I.	Sh.	In.		19	6		IV.	Oc.	Re.
	17	31		III.	Tr.	In.		11	51		I.	Tr.	Eg.		23	58	1	IV.	Ec.	Dis.
	18	29		II.	Sh.	In.		12	54		I.	Sh.	Eg.	24	3	15		I.	Oc.	Dis.
	19	5		II.	Tr.	Eg.	15	5	6		IV.	Tr.	In.		3	52	50	IV.	Ec.	Re.
	19	10	49	I.	Ec.	Re.		6	45		I.*	Oc.	Dis.		6	0		II.*	Oc.	Dis.
	20	53		III.	Tr.	Eg.		8	20		II.	Tr.	In.		6	26	54	I.*	Ec.	Re.
	21	21		II.	Sh.	Eg.		8	40		IV.	Tr.	Eg.		10	43	6	II.	Ec.	Re.
	22	5		III.	Sh.	In.		10	3	16	I.	Ec.	Re.	25	0	34		I.	Tr.	In.
5	1	35		III.	Sh.	Eg		10	21		II.	Sh.	In.		1	28		I.	Sh.	In.
	13	3		I.	Tr.	In.		11	11		II.	Tr.	Eg.		2	53		I.	Tr.	Eg.
	14	11		I.	Sh.	In.		12	6		III.	Oc.	Dis.		3	47		I.	Sh.	Eg.
	15	21		I.	Tr.	Eg.		13	14		II.	Sh.	Eg.		21	45		I.	Oc.	Dis.
	16	30		I.	Sh.	Eg.		14	49		IV.	Sh.	In.	26	0	28		II.	Tr.	In.
6	10	16		I.	Oc.	Dis.		15	31		III.	Oc.	Re.		0	55	36	I.	Ec.	Re.
	11	0		II.	Oc.	Dis.		16	18	9	III.	Ec.	Dis.		2	14		II.	Sh.	In.
	13	39	35	I.	Ec.	Re.		18	48		IV.	Sh.	Eg.		3	20		II.	Tr.	Eg.
	16	8	17	II.	Ec.	Re.		19	39	53	III.	Ec.	Re.		5	7		II.	Sh.	Eg.
	19	34		IV.	Oc.	Dis.	16	4	3		I.	Tr.	In.		6	33		III.*	Tr.	In.
	23	2		IV.	Oc.	Re.		5	4		I.	Sh.	In.		10	0		III.	Tr.	Eg.
7	5	53	17	IV.*	Ec.	Dis.		6	21		I.*	Tr.	Eg.		10	7		III.	Sh.	In.
	7	33		I.*	Tr.	In.		7	23		I.*	Sh.	Eg.		13	40		III.	Sh.	Eg.
	8	39		I.	Sh.	In.	17	1	15		I.	Oc.	Dis.		19	4		I.	Tr.	In.
	9	41	45	IV.	Ec.	Re.		3	11		II.	Oc.	Dis.		19	57		I.	Sh.	In.
	9	51		I.	Tr.	Eg.		4	31	59	I.	Ec.	Re.		21	23		I.	Tr.	Eg.
	10	59		I.	Sh.	Eg.		8	5	4	II.	Ec.	Re.		22	16		I.	Sh.	Eg.
8	4	45		I.	Oc.	Dis.		22	33		I.	Tr.	In.	27	16	15		I.	Oc.	Dis.
	5	35		II.*	Tr.	In.		23	33		I.	Sh.	In		19	24	21	I.	Ec.	Re.
	7	46		II.*	Sh.	In.	18	0	52		I.	Tr.	Eg.		19	25		II.	Oc.	Dis.
	7	48		III.*	Oc.	Dis.		1	52		I.	Sh.	Eg.	28	0	2	34	II.	Ec.	Re.
	8	8	19	I.	Ec.	Re.		19	45		I.	Oc.	Dis.		13	34		I.	Tr.	In.
	8	26		II.	Tr.	Eg.		21	42		II.	Tr.	In.		14	26		I.	Sh.	In.
	10	39		II.	Sh.	Eg.		23	0	43	I.	Ec.	Re.		15	53		I.	Tr.	Eg.
	11	11		III.	Oc.	Re.		23	39		II.	Sh.	In.		16	45		I.	Sh.	Eg.
	12	18	18	III.	Ec.	Dis.	19	0	34		II.	Tr.	Eg.	29	10	46		I.	Oc.	Dis.
	15	39	21	III.	Ec.	Re.		2	10		III.	Tr.	In.		13	52		II.	Tr.	In.
9	2	3		I.	Tr.	In.		2	32		II.	Sh.	Eg.		13	53	2	I.	Ec.	Re.
	3	8		I.	Sh.	In.		5	35		III.*	Tr.	Eg.		15	32		II.	Sh.	In.
	4	21		I.	Tr.	Eg.		6	7		III.*	Sh.	In.		16	44		II.	Tr.	Eg.
	5	28		I.*	Sh.	Eg.		9	38		III.	Sh.	Eg.		18	25		II.	Sh.	Eg.
	23	15		I.	Oc.	Dis.		17	3		I.	Tr.	In.		20	51		III.	Oc.	Dis.
10	0	23		II.	Oc.	Dis.		18	2		I.	Sh.	In.	30	3	40	55	III.	Ec.	Re.
	2	37	3	I.	Ec.	Re.		19	22		I.	Tr.	Eg.		8	4		I.	Tr.	In.
	5	26	52	II.*	Ec.	Re.		20	21		I.	Sh.	Eg.		8	54		I.	Sh.	In.
															10	23		I.	Tr.	Eg.
															11	14		I.	Sh.	Eg.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

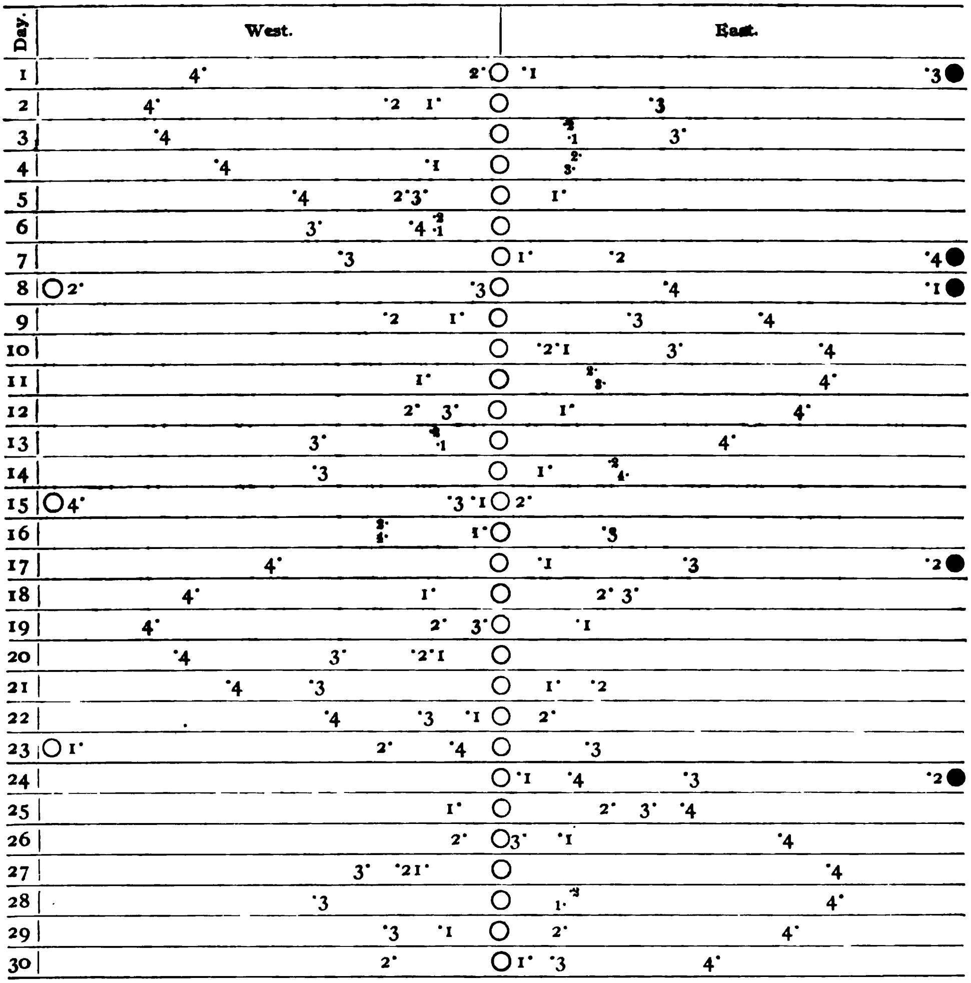
WASHINGTON MEAN TIME.

NOVEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 6ʰ 30ᵐ for an Inverting Telescope.



WASHINGTON MEAN TIME.

DECEMBER.

d	h	m	s				d	h	m	s				d	h	m	s			
1	5	16		I.*	Oc.	Dis.	7	10	6		I.	Tr.	In.	13	22	20		II.	Tr.	Eg.
	8	21	45	I.	Ec.	Re.		10	50		I.	Sh.	In.		23	36		II.	Sh	Eg.
	8	50		II.	Oc.	Dis.		12	25		I.	Tr.	Eg.	14	5	44		III.*	Oc.	Dis.
	13	21	0	II.	Ec.	Re.		13	9		I.	Sh.	Eg.		11	42	44	III.	Ec.	Re.
2	1	18		IV.	Tr.	In.	8	7	17		I.	Oc.	Dis.		12	8		I.	Tr.	In.
	2	35		I.	Tr.	In.		10	16	34	I.	Ec.	Re.		12	45		I.	Sh.	In.
	3	23		I.	Sh.	In.		11	40		II.	Oc.	Dis.		14	27		I.	Tr.	Eg.
	4	54		I.	Tr.	Eg.		15	58	45	II.	Ec.	Re.		15	5		I.	Sh.	Eg.
	5	3		IV.	Tr.	Eg.	9	4	36		I.	Tr.	In.	15	9	18		I.	Oc.	Dis.
	5	43		I.*	Sh.	Eg.		5	19		I.*	Sh.	In.		12	11	21	I.	Ec.	Re.
	8	56		IV.	Sh.	In.		6	55		I.	Tr.	Eg.		14	32		II.	Oc.	Dis.
	13	1		IV.	Sh.	Eg.		7	38		I.	Sh.	Eg.		18	36	19	II.	Ec.	Re.
	23	46		I.	Oc.	Dis.	10	1	47		I.	Oc.	Dis.	16	6	38		I.	Tr.	In.
3	2	50	27	I.	Ec.	Re.		4	45	15	I.	Ec.	Re.		7	14		I.	Sh.	In.
	3	15		II.	Tr.	In.		6	3		II.*	Tr.	In.		8	57		I.	Tr.	Eg.
	4	49		II.	Sh.	In.		7	25		II.	Sh.	In.		9	33		I.	Sh.	Eg.
	6	7		II.*	Tr.	Eg.		8	56		II.	Tr.	Eg.	17	3	48		I.	Oc.	Dis.
	7	42		II.	Sh.	Eg.		10	18		II.	Sh.	Eg.		6	40	1	I.	Ec.	Re.
	10	58		III.	Tr.	In.		11	44		IV.	Oc.	Dis.		8	52		II.	Tr.	In.
	14	8		III.	Sh.	In.		15	24		III.	Tr.	In.		10	0		II.	Sh.	In.
	14	26		III.	Tr.	Eg.		15	34		IV.	Oc.	Re.		11	44		II.	Tr.	Eg.
	17	41		III.	Sh.	Eg.		18	2	11	IV.	Ec.	Dis.		12	53		II.	Sh.	Eg.
	21	5		I.	Tr.	In.		18	8		III.	Sh.	In.		19	52		III.	Tr.	In.
	21	52		I.	Sh.	In.		18	53		III.	Tr.	Eg.		22	8		III.	Sh.	In.
	23	24		I.	Tr.	Eg.		21	42		III.	Sh.	Eg.		23	22		III.	Tr.	Eg.
4	0	12		I.	Sh.	Eg.		22	2	51	IV.	Ec.	Re.	18	1	9		I.	Tr.	In.
	18	16		I.	Oc.	Dis.		23	7		I.	Tr.	In.		1	42		III.	Sh.	Eg.
	21	19	12	I.	Ec.	Re.		23	47		I.	Sh.	In.		1	43		I.	Sh.	In.
	22	16		II.	Oc.	Dis.	11	1	26		I.	Tr.	Eg.		3	28		I.	Tr.	Eg.
5	2	40	22	II.	Ec.	Re.		2	7		I.	Sh.	Eg.		4	2		I.	Sh.	Eg.
	15	36		I.	Tr.	In.		20	17		I.	Oc.	Dis.		21	52		IV.	Tr.	In.
	16	21		I.	Sh.	In.		23	13	59	I.	Ec.	Re.		22	19		I.	Oc.	Dis.
	17	54		I.	Tr.	Eg.	12	1	6		II.	Oc.	Dis.	19	1	8	44	I.	Ec.	Re.
	18	40		I.	Sh.	Eg.		5	18	0	II.*	Ec.	Re.		1	48		IV.	Tr.	Eg.
6	12	46		I.	Oc.	Dis.		17	37		I.	Tr.	In.		3	3		IV.	Sh.	In.
	15	47	52	I.	Ec.	Re.		18	16		I.	Sh.	In.		3	58		II.	Oc.	Dis.
	16	39		II.	Tr.	In.		19	56		I.	Tr.	Eg.		7	15		IV.	Sh.	Eg.
	18	7		II.	Sh.	In.		20	36		I.	Sh.	Eg.		7	55	26	II.	Ec.	Re.
	19	31		II.	Tr.	Eg.	13	14	48		I.	Oc.	Dis.		19	40		I.	Tr.	In.
	21	0		II.	Sh.	Eg.		17	42	39	I.	Ec.	Re.		20	12		I.	Sh.	In.
7	1	17		III.	Oc.	Dis.		19	27		II.	Tr.	In.		21	59		I.	Tr.	Eg.
	7	42	2	III.	Ec.	Re.		20	42		II.	Sh.	In.		22	31		I.	Sh.	Eg.

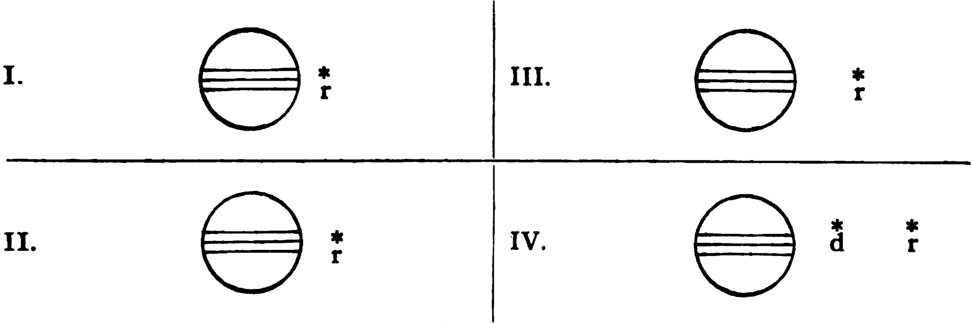
By reason of the proximity of Jupiter to the Sun the phenomena of the satellites are not given after December 19.

Note.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

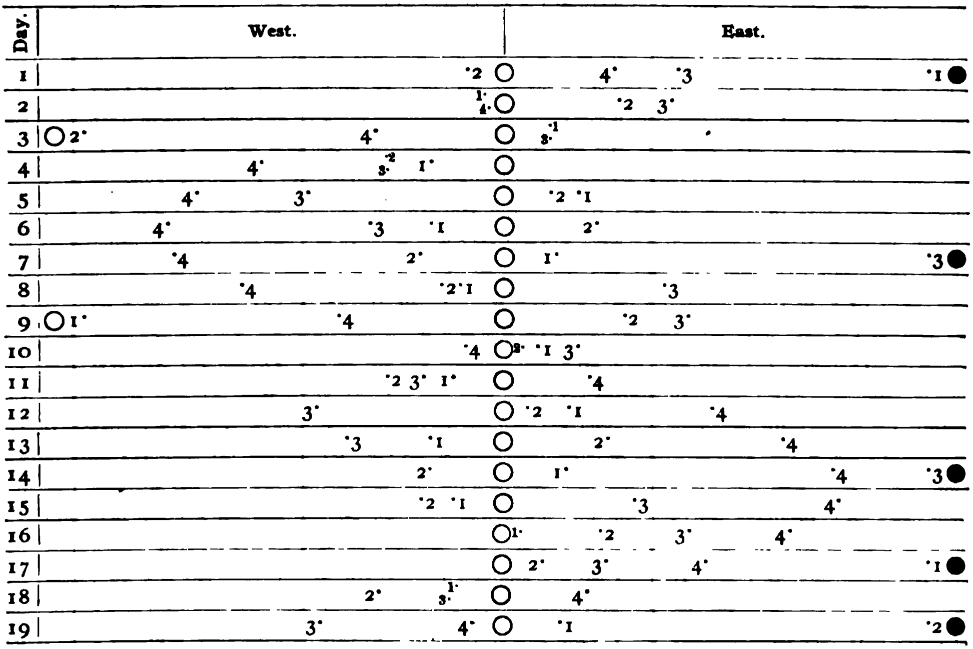
WASHINGTON MEAN TIME.

DECEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 5h 45m for an Inverting Telescope.



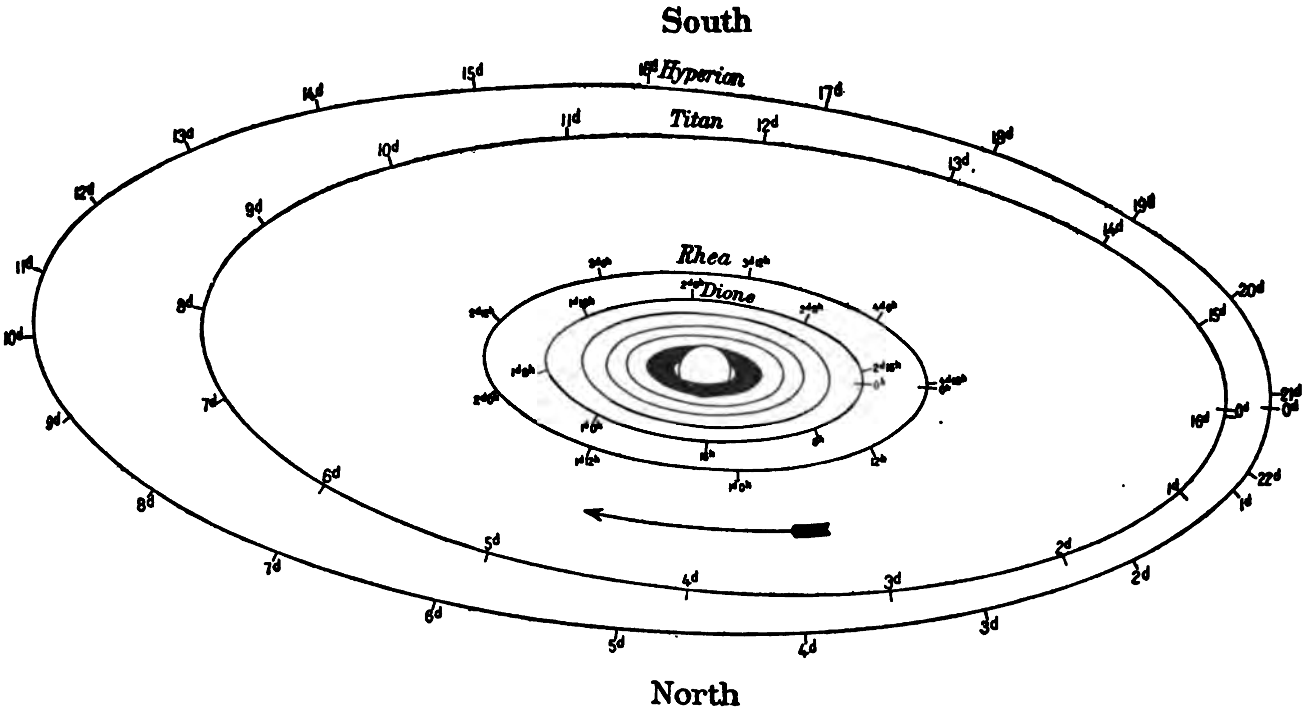
ELEMENTS FOR DETERMINING THE GEOCENTRIC POSITION, APPEARANCE, AND MAGNITUDE OF SATURN'S RINGS.

Washington Mean Noon.		a	b	p	l	l'	u	u'	Stellar Mag.
		Outer Major Axis.	Outer Minor Axis.	Inclination of Northern Semi-minor Axis to Circle of Declination from North to East.	The Elevation of the Earth above the Plane of the Rings.	The Elevation of the Sun above the Plane of the Rings.	Earth's Longitude from Saturn counted on Plane of Rings from the Rings' Ascending Node on—		
							Equator.	Ecliptic.	
		″	″	° ′	° ′	° ′	° ′	° ′	
Jan.	0	45.10	−18.42	−2 28.3	−24 6.8	−24 57.7	110 5.5	67 34.2	0.0
	10	44.45	18.13	2 25.0	24 4.8	25 1.5	109 38.0	67 6.8	+0.1
	20	43.72	17.84	2 23.0	24 4.7	25 5.2	109 21.7	66 50.5	0.2
	30	42.95	17.55	2 22.6	24 6.8	25 8.8	109 17.3	66 46.2	0.2
Feb.	9	42.17	17.27	2 23.5	24 11.1	25 12.5	109 25.2	66 54.1	0.3
	19	41.39	−17.03	−2 26.0	−24 17.3	−25 16.0	109 45.0	67 14.0	+0.3
Mar.	1	40.65	16.81	2 29.8	24 25.2	25 19.5	110 16.4	67 45.5	0.3
	11	39.96	16.62	2 34.9	24 34.6	25 22.9	110 58.3	68 27.5	0.4
	21	39.34	16.47	2 41.2	24 45.0	25 26.2	111 49.9	69 19.1	0.4
	31	38.79	16.35	2 48.4	24 56.1	25 29.4	112 49.9	70 19.2	0.4
Apr.	10	38.32	−16.27	−2 56.4	−25 7.6	−25 32.6	113 57.3	71 26.6	+0.4
	20	37.93	16.22	3 5.2	25 19.0	25 35.8	115 10.8	72 40.2	0.3
	30	37.63	16.20	3 14.4	25 30.1	25 38.8	116 29.3	73 58.7	0.3
May	10	37.42	16.21	3 24.0	25 40.6	25 41.9	117 51.4	75 20.9	0.3
	20	37.30	16.25	3 33.8	25 50.2	25 44.8	119 16.1	76 45.6	0.3
	30	37.27	−16.32	−3 43.6	−25 58.9	−25 47.7	120 42.0	78 11.6	+0.2
June	9	37.32	16.42	3 53.2	26 6.4	25 50.4	122 8.0	79 37.6	0.3
	19	37.46	16.55	4 2.6	26 12.7	25 53.2	123 33.0	81 2.6	0.3
	29	37.69	16.70	4 11.7	26 17.8	25 55.8	124 55.6	82 25.2	0.3
July	9	38.00	16.88	4 20.2	26 21.7	25 58.4	126 14.7	83 44.4	0.3
	19	38.40	−17.08	−4 28.0	−26 24.5	−26 1.0	127 29.1	84 58.9	+0.3
	29	38.88	17.31	4 35.2	26 26.2	26 3.5	128 37.6	86 7.5	0.3
Aug.	8	39.44	17.56	4 41.4	26 27.1	26 5.9	129 39.1	87 9.0	0.3
	18	40.07	17.84	4 46.8	26 27.2	26 8.2	130 32.2	88 2.2	0.3
	28	40.75	18.15	4 51.1	26 26.7	26 10.5	131 16.0	88 46.0	0.3
Sept.	7	41.49	−18.47	−4 54.4	−26 25.9	−26 12.6	131 49.3	89 19.3	+0.2
	17	42.26	18.80	4 56.5	26 24.9	26 14.7	132 11.3	89 41.4	0.2
	27	43.05	19.14	4 57.5	26 23.8	26 16.8	132 21.3	89 51.5	0.2
Oct.	7	43.82	19.47	4 57.2	26 22.8	26 18.9	132 19.1	89 49.3	+0.1
	17	44.56	19.79	4 55.7	26 21.8	26 20.7	132 4.6	89 34.8	0.0
	27	45.23	−20.07	−4 53.1	−26 21.0	−26 22.4	131 38.5	89 8.8	0.0
Nov.	6	45.79	20.31	4 49.5	26 20.2	26 24.2	131 2.0	88 32.3	−0.1
	16	46.23	20.50	4 45.0	26 19.4	26 25.9	130 16.9	87 47.3	0.2
	26	46.50	20.61	4 39.8	26 18.6	26 27.5	129 25.6	86 56.1	0.2
Dec.	6	46.61	20.65	4 34.2	26 17.9	26 29.1	128 31.0	86 1.5	0.2
	16	46.53	−20.60	−4 28.5	−26 17.2	−26 30.6	127 36.2	85 6.8	−0.2
	26	46.27	20.48	4 23.0	26 16.5	26 32.0	126 44.2	84 14.8	0.2
	31	46.07	−20.39	−4 20.5	−26 16.3	−26 32.6	126 20.3	83 50.9	−0.2

The factor to be multiplied by *a* and *b* to obtain the axes of—

The inner ellipse of the outer ring =0.8801,	log factor=9.9445
The outer ellipse of the inner ring =0.8599,	log factor=9.9344
The inner ellipse of the inner ring =0.6650,	log factor=9.8228
The inner ellipse of the dusky ring=0.5486,	log factor=9.7392

Note.—The negative sign of *l* indicates that the visible surface of the rings is the southern one.



NAMES OF THE SATELLITES.	
I.	Mimas.
II.	Enceladus.
III.	Tethys.
IV.	Dione.
V.	Rhea.
VI.	Titan.
VII.	Hyperion.
VIII.	Iapetus.
IX.	Phœbe.

APPARENT ORBITS OF THE SEVEN INNER SATELLITES OF SATURN,

AT DATE OF OPPOSITION, DECEMBER 6, 1913,

AS SEEN IN AN INVERTING TELESCOPE.

MEAN SYNODIC PERIODS.	d	h
I.	0	22.6
II.	1	8.9
III.	1	21.3
IV.	2	17.7
V.	4	12.5
VI.	15	23.3
VII.	21	7.6
VIII.	79	22.1
IX.	580	2.9

WASHINGTON MEAN TIME OF GREATEST ELONGATION, ETC.

In the diagram on the preceding page, the points of the orbits marked "*o*" are those of the eastern elongation, as seen in an inverting telescope. The times of these elongations may be found from the following tables, and the apparent position of a satellite at any other time may be marked on the diagram by setting off on the proper orbit the elapsed interval in days and hours since the last eastern elongation. The orbits of the five inner satellites are regarded as circular, and the time of any elongation not given in the tables may be readily found from those given by adding or substracting the proper multiple of the mean synodic period. Mimas can be seen only within a few hours of each elongation, and the time of every elongation visible at Washington is given. For the three outer satellites the eccentricity is taken into account, and the times both of the elongations and of the conjunctions are given. The following abbreviations are used in the tables:

E., East Elongation.	I., Inferior Conjunction (north of planet).
W., West Elongation.	S., Superior Conjunction (south of planet).

MIMAS.

Greatest Elongations Visible at Washington.

	d	h		d	h		d	h		d	h		d	h		d	h
Jan.	2	14.6 E.	Jan.	30	9.8 W.	Oct.	2	12.0 W.	Nov.	1	15.6 W.	Nov.	24	6.3 W.	Dec.	12	15.2 E.
	3	13.2 E.		31	8.4 W.		3	10.6 W.		2	14.2 W.		24	17.5 E.		13	13.8 E.
	4	11.8 E.	Feb.	1	7.0 W.		7	16.2 E.		3	12.8 W.		25	16.1 E.		14	12.4 E.
	5	10.4 E.		5	12.9 E.		8	14.8 E.		4	11.5 W.		26	14.7 E.		15	11.0 E.
	6	9.0 E.		6	11.5 E.		9	13.4 E.		5	10.1 W.		27	13.4 E.		16	9.6 E.
	7	7.7 E.		7	10.1 E.		10	12.1 E.		6	8.7 W.		28	12.0 E.		17	8.2 E.
	8	6.3 E.		8	8.7 E.		11	10.7 E.		8	17.1 E.		29	10.6 E.		18	6.8 E.
	10	14.8 W.		9	7.4 E.		12	9.3 E.		9	15.7 E.		30	9.2 E.		19	5.4 E.
	11	13.4 W.		14	11.7 W.		15	16.6 W.		10	14.3 E.	Dec.	1	7.8 E.		19	16.8 W.
	12	12.0 W.		15	10.3 W.		16	15.2 W.		11	12.9 E.		2	6.4 E.		20	15.4 W.
	13	10.7 W.		16	8.9 W.		17	13.8 W.		12	11.6 E.		2	17.8 W.		21	14.0 W.
	14	9.3 W.		17	7.6 W.		18	12.4 W.		13	10.2 E.		3	16.4 W.		22	12.6 W.
	15	7.9 W.		. .	. .		19	11.0 W.		14	8.8 E.		4	15.0 W.		23	11.3 W.
	16	6.5 W.	Sept.	20	17.2 E.		20	9.7 W.		15	7.4 E.		5	13.6 W.		24	9.9 W.
	19	13.7 E.		21	15.8 E.		23	16.7 E.		16	17.4 W.		6	12.3 W.		25	8.5 W.
	20	12.3 E.		22	14.4 E.		24	15.3 E.		17	16.0 W.		7	10.9 W.		26	7.1 W.
	21	11.0 E.		23	13.0 E.		25	13.9 E.		18	14.6 W.		8	9.5 W.		27	5.7 W.
	22	9.6 E.		24	11.6 E.		26	12.5 E.		19	13.3 W.		9	8.1 W.		27	17.0 E.
	23	8.2 E.		25	10.2 E.		27	11.1 E.		20	11.9 W.		10	6.7 W.		28	15.6 E.
	24	6.8 E.		29	16.1 W.		28	9.7 E.		21	10.5 W.		10	17.9 E.		29	14.2 E.
	28	12.5 W.		30	14.7 W.		29	8.4 E.		22	9.1 W.		11	5.3 W.		30	12.8 E.
	29	11.2 W.	Oct.	1	13.3 W.		31	17.0 W.		23	7.7 W.		11	16.5 E.		31	11.4 E.

ENCELADUS.

	d	h		d	h		d	h		d	h		d	h		d	h
Jan.	2	5.2 E.	Jan.	15	22.0 E.	Jan.	29	14.9 E.	Feb.	12	7.8 E.	Feb.	26	0.8 E.	Mar.	11	17.7 E.
	3	14.1 E.		17	6.9 E.		30	23.8 E.		13	16.7 E.		27	9.7 E.		. .	. .
	4	23.0 E.		18	15.8 E.	Feb.	1	8.7 E.		15	1.6 E.		28	18.6 E.	Aug.	20	12.0 E.
	6	7.9 E.		20	0.7 E.		2	17.6 E.		16	10.5 E.	Mar.	2	3.5 E.		21	20.9 E.
	7	16.8 E.		21	9.6 E.		4	2.5 E.		17	19.4 E.		3	12.4 E.		23	5.8 E.
	9	1.6 E.		22	18.5 E.		5	11.4 E.		19	4.3 E.		4	21.2 E.		24	14.7 E.
	10	10.5 E.		24	3.4 E.		6	20.3 E.		20	13.2 E.		6	6.1 E.		25	23.6 E.
	11	19.4 E.		25	12.3 E.		8	5.2 E.		21	22.1 E.		7	15.0 E.		27	8.5 E.
	13	4.3 E.		26	21.2 E.		9	14.1 E.		23	7.0 E.		8	23.9 E.		28	17.4 E.
	14	13.2 E.		28	6.1 E.		10	23.0 E.		24	15.9 E.		10	8.8 E.		30	2.2 E.

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

ENCELADUS—(*Concluded*).

	d	h		d	h		d	h		d	h		d	h		d	h
Aug	31	11.1 E.	Sept.	21	0.4 E.	Oct.	11	13.7 E.	Nov.	1	2.8 E.	Nov.	21	15.9 E.	Dec.	12	5.0 E.
Sept.	1	20.0 E.		22	9.3 E.		12	22.6 E.		2	11.7 E.		23	0.8 E.		13	13.9 E.
	3	4.9 E.		23	18.2 E.		14	7.5 E.		3	20.6 E.		24	9.7 E.		14	22.8 E.
	4	13.8 E.		25	3.1 E.		15	16.4 E.		5	5.5 E.		25	18.6 E.		16	7.7 E.
	5	22.7 E.		26	12.0 E.		17	1.2 E.		6	14.3 E.		27	3.4 E.		17	16.5 E.
	7	7.6 E.		27	20.9 E.		18	10.0 E		7	23.2 E.		28	12.3 E.		19	1.4 E.
	8	16.5 E.		29	5.8 E.		19	18.9 E.		9	8.1 E.		29	21.2 E.		20	10.3 E.
	10	1.4 E.		30	14.7 E.		21	3.8 E.		10	17.0 E.	Dec.	1	6.1 E.		21	19.2 E.
	11	10.3 E.	Oct.	1	23.6 E.		22	12.7 E.		12	1.9 E.		2	15.0 E.		23	4.1 E.
	12	19.1 E.		3	8.4 E.		23	21.5 E.		13	10.7 E.		3	23.8 E.		24	12.9 E.
	14	4.0 E.		4	17.3 E.		25	6.4 E.		14	19.5 E.		5	8.6 E.		25	21.8 E.
	15	12.9 E.		6	2.2 E.		26	15.3 E.		16	4.4 E.		6	17.5 E.		27	6.6 E.
	16	21.8 E.		7	11.1 E.		28	0.2 E.		17	13.3 E.		8	2.4 E.		28	15.5 E.
	18	6.7 E.		8	20.0 E.		29	9.1 E.		18	22.1 E.		9	11.3 E.		30	0.4 E.
	19	15.5 E.		10	4.8 E.		30	17.9 E.		20	7.0 E.		10	20.1 E.		31	9.3 E.

TETHYS.

	d	h		d	h		d	h		d	h		d	h		d	h
Jan.	2	8.2 E.	Feb.	7	5.0 E.	Mar.	15	2.2 E.	Sept.	16	4.9 E.	Oct.	22	1.6 E.	Nov.	26	22.1 E.
	4	5.5 E.		9	2.3 E.		16	23.5 E.		18	2.2 E.		23	22.9 E.		28	19.4 E.
	6	2.8 E.		10	23.6 E.		. . . .			19	23.5 E.		25	20.2 E.		30	16.7 E.
	8	0.1 E.		12	20.9 E.	Aug.	16	23.8 E.		21	20.8 E.		27	17.5 E.	Dec.	2	14.0 E.
	9	21.4 E.		14	18.3 E.		18	21.2 E.		23	18.1 E.		29	14.8 E.		4	11.2 E.
	11	18.7 E.		16	15.6 E.		20	18.5 E.		25	15.4 E.		31	12.1 E.		6	8.5 E.
	13	16.0 E.		18	12.9 E.		22	15.8 E.		27	12.7 E.	Nov.	2	9.4 E.		8	5.8 E.
	15	13.3 E.		20	10.2 E.		24	13.1 E.		29	10.0 E.		4	6.7 E.		10	3.1 E.
	17	10.6 E.		22	7.6 E.		26	10.4 E.	Oct.	1	7.3 E.		6	4.0 E.		12	0.4 E.
	19	7.9 E.		24	4.9 E.		28	7.8 E.		3	4.6 E.		8	1.2 E.		13	21.7 E.
	21	5.2 E.		26	2.2 E.		30	5.1 E.		5	1.9 E.		9	22.5 E.		15	19.0 E.
	23	2.5 E.		27	23.5 E.	Sept.	1	2.4 E.		6	23.2 E.		11	19.8 E.		17	16.3 E.
	24	23.8 E.	Mar.	1	20.9 E.		2	23.7 E.		8	20.5 E.		13	17.1 E.		19	13.6 E.
	26	21.1 E.		3	18.2 E.		4	21.0 E.		10	17.8 E.		15	14.4 E.		21	10.8 E.
	28	18.4 E.		5	15.5 E.		6	18.3 E.		12	15.2 E.		17	11.7 E.		23	8.1 E.
	30	15.7 E.		7	12.8 E.		8	15.6 E.		14	12.5 E.		19	9.0 E.		25	5.4 E.
Feb.	1	13.0 E.		9	10.2 E.		10	13.0 E.		16	9.8 E.		21	6.2 E.		27	2.7 E.
	3	10.4 E.		11	7.5 E.		12	10.3 E.		18	7.0 E.		23	3.5 E.		29	0.0 E.
	5	7.7 E.		13	4.8 E.		14	7.6 E.		20	4.3 E.		25	0.8 E.		30	21.3 E.

DIONE.

	d	h		d	h		d	h		d	h		d	h		d	h
Jan.	2	18.5 E.	Feb.	7	8.4 E.	Mar.	14	22.7 E.	Sept.	17	5.1 E.	Oct.	22	18.9 E.	Nov.	27	8.3 E.
	5	12.1 E.		10	2.1 E.		17	16.4 E.		19	22.8 E.		25	12.5 E.		30	1.9 E.
	8	5.8 E.		12	19.8 E.		20	10.2 E.		22	16.5 E.		28	6.2 E.	Dec.	2	19.6 E.
	10	23.5 E.		15	13.5 E.		. . . .			25	10.2 E.		30	23.8 E.		5	13.2 E.
	13	17.2 E.		18	7.2 E.	Aug.	23	13.8 E.		28	3.8 E.	Nov.	2	17.5 E.		8	6.8 E.
	16	10.8 E.		21	0.9 E.		26	7.5 E.		30	21.5 E.		5	11.2 E.		11	0.5 E.
	19	4.5 E.		23	18.6 E.		29	1.2 E.	Oct.	3	15.2 E.		8	4.8 E.		13	18.1 E.
	21	22.2 E.		26	12.4 E.		31	18.9 E.		6	8.9 E.		10	22.4 E.		16	11.8 E.
	24	15.9 E.	Mar.	1	6.1 E.	Sept.	3	12.6 E.		9	2.6 E.		13	16.1 E.		19	5.4 E.
	27	9.6 E.		3	23.8 E.		6	6.3 E.		11	20.2 E.		16	9.7 E.		21	23.1 E.
	30	3.3 E.		6	17.5 E.		9	0.0 E.		14	13.9 E.		19	3.4 E.		24	16.7 E.
Feb.	1	21.0 E.		9	11.2 E.		11	17.7 E.		17	7.6 E.		21	21.0 E.		27	10.4 E.
	4	14.7 E.		12	5.0 E.		14	11.4 E.		20	1.2 E.		24	14.7 E.		30	4.0 E.

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

RHEA.				TITAN.				HYPERION.			
	d h		d h		d h		d h		d		d
Jan.	4 19.1 E.	Sept.	24 2.3 E.	Jan.	2 2.3 I.	Oct.	8 22.5 S.	Jan.	5.6 W.	Sept.	8.2 E.
	9 7.5 E.		28 14.8 E.		5 22.1 W.		13 1.0 E.		11.6 S.		12.9 I.
	13 19.9 E.	Oct.	3 3.2 E.		9 19.6 S.		17 1.2 I.		16.7 E.		18.7 W.
	18 8.3 E.		7 15.6 E.		13 22.9 E.		20 21.7 W.		21.4 I.		24.6 S.
	22 20.7 E.		12 4.0 E.		18 0.4 I.		24 20.6 S.		26.9 W.		29.4 E.
	27 9.1 E.		16 16.3 E.		21 20.4 W.		28 23.0 E.	Feb.	1.9 S.	Oct.	4.1 I.
	31 21.6 E.		21 4.7 E.		25 18.0 S.	Nov.	1 23.1 I.		7.0 E.		9.9 W.
Feb.	5 10.0 E.		25 17.0 E.		29 21.4 E.		5 19.5 W.		11.7 I.		15.8 S.
	9 22.5 E.		30 5.4 E.	Feb.	2 23.1 I.		9 18.1 S.		17.2 W.		20.6 E.
	14 10.9 E.	Nov.	3 17.7 E.		6 19.2 W.		13 20.5 E.		23.2 S.		25.2 I.
	18 23.4 E.		8 6.0 E.		10 17.0 S.		17 20.6 I.		28.3 E.		31.0 W.
	23 11.9 E.		12 18.3 E.		14 20.5 E.		21 16.8 W.	Mar	5.0 I.	Nov.	6.0 S.
	28 0.4 E.		17 6.6 E.		18 22.2 I.		25 15.4 S.		10.6 W.		10.7 E.
Mar.	4 12.9 E.		21 18.9 E.		22 18.5 W.		29 17.7 E.		16.5 S.		15.3 I.
	9 1.5 E.		26 7.2 E.		. . . .	Dec.	3 17.8 I.		21.6 E.		21.1 W.
. . . .			30 19.5 E.	Sept.	11 3.5 E.		7 14.1 W.		26.4 I.		27.1 S.
Aug.	27 23.6 E.	Dec.	5 7.8 E.		15 3.9 I.		11 12.5 S.		. . .	Dec.	1.8 E.
Sept.	1 12.1 E.		9 20.1 E.		19 0.7 W.		15 14.9 E.	Aug.	13.1 S.		6.5 I.
	6 0.5 E.		14 8.4 E.		22 23.8 S.		19 15.1 I.		18.0 E.		12.2 W.
	10 13.0 E.		18 20.7 E.		27 2.5 E.		23 11.3 W.		22.6 I.		18.2 S.
	15 1.5 E.		23 9.0 E.	Oct.	1 2.8 I.		27 9.6 S.		28.4 W.		23.0 E.
	19 13.9 E.		27 21.4 E.		4 23.5 W.		31 12.1 E.	Sept.	3.4 S.		27.6 I.

IAPETUS.

	d		d		d		d		d		d
Jan.	8.9 S.	Feb.	18.8 I.		. . .	Sept.	8.5 S.	Oct.	19.5 I.	Nov.	26.3 S.
	29.1 E.	Mar.	10.4 W.	Aug.	20.1 W.		29.0 E.	Nov.	7.5 W.	Dec.	16.3 E.

NINTH SATELLITE OF SATURN.

DIFFERENTIAL COORDINATES OF PHŒBE FOR 1913.

Washington Mean Noon.	$\alpha_{Ph.}-\alpha_{Sat.}$	$\delta_{Ph.}-\delta_{Sat.}$	Washington Mean Noon.	$\alpha_{Ph.}-\alpha_{Sat.}$	$\delta_{Ph.}-\delta_{Sat.}$	Washington Mean Noon.	$\alpha_{Ph}-\alpha_{Sat.}$	$\delta_{Ph.}-\delta_{Sat.}$
	m s	′ ″		m s	′ ″		m s	′ ″
Jan. 1	+2 19.1	+11 46	Apr. 7	+0 15.2	+2 45	Sept. 30	−1 24.6	−4 55
5	2 15.5	11 35	11	0 9.1	2 19	Oct. 4	1 19.3	4 48
9	2 11.7	11 22	15	+0 3.0	1 53	8	1 13.6	4 41
13	2 7.8	11 8	19	−0 3.1	+1 28	12	1 7.5	4 33
17	2 3.7	10 52	. . .	. . .	. . .	16	1 1.1	4 23
21	1 59.3	10 35	July 16	−1 49.8	−4 38	20	0 54.6	4 13
25	1 54.7	10 16	20	1 52.0	4 45	24	0 47.9	4 2
29	1 50.0	9 56	24	1 53.9	4 51	28	0 41.0	3 50
Feb. 2	1 45.3	9 35	28	1 55.4	4 56	Nov. 1	0 33.8	3 36
6	1 40.4	9 14	Aug. 1	1 56.6	5 1	5	0 26.5	3 21
10	1 35.4	8 52	5	1 57.4	5 5	9	0 19.1	3 6
14	1 30.2	8 28	9	1 57.8	5 8	13	0 11.6	2 49
18	1 24.9	8 4	13	1 57.8	5 11	17	−0 4.1	2 31
22	1 19.5	7 40	17	1 57.5	5 13	21	+0 3.4	2 11
26	1 14.1	7 15	21	1 56.7	5 15	25	0 10.9	1 51
Mar. 2	1 8.5	6 48	25	1 55.4	5 16	29	0 18.4	1 30
6	1 2.8	6 21	29	1 53.7	5 16	Dec. 3	0 25.8	1 8
10	0 57.0	5 54	Sept. 2	1 51.5	5 16	7	0 33.1	0 45
14	0 51.2	5 27	6	1 48.8	5 15	11	0 40.3	−0 22
18	0 45.3	5 0	10	1 45.8	5 13	15	0 47.3	+0 2
22	0 39.3	4 32	14	1 42.4	5 11	19	0 54.2	0 26
26	0 33.3	4 5	18	1 38.6	5 8	23	1 0.8	0 51
30	0 27.3	3 38	22	1 34.3	5 4	27	1 7.2	1 16
Apr. 3	+0 21.2	+ 3 11	26	−1 29.6	−5 0	31	+1 13.4	+1 41

FRACTIONS OF THE PERIODS OF REVOLUTION.

Fraction of a Revolution.	Mimas.	Enceladus.		Tethys.		Dione.		Rhea.		Titan.		Fraction of a Revolution.
	h	d	h	d	h	d	h	d	h	d	h	
0.00	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.00
0.02	0.5	0	0.7	0	0.9	0	1.3	0	2.2	0	7.7	0.02
0.04	0.9	0	1.3	0	1.8	0	2.6	0	4.3	0	15.3	0.04
0.06	1.4	0	2.0	0	2.7	0	3.9	0	6.5	0	23.0	0.06
0.08	1.8	0	2.6	0	3.6	0	5.3	0	8.7	1	6.6	0.08
0.10	2.3	0	3.3	0	4.5	0	6.6	0	10.8	1	14.3	0.10
0.12	2.7	0	4.0	0	5.4	0	7.9	0	13.0	1	21.9	0.12
0.14	3.2	0	4.6	0	6.3	0	9.2	0	15.2	2	5.6	0.14
0.16	3.6	0	5.3	0	7.2	0	10.5	0	17.3	2	13.2	0.16
0.18	4.1	0	5.9	0	8.2	0	11.8	0	19.5	2	20.9	0.18
0.20	4.5	0	6.6	0	9.1	0	13.1	0	21.7	3	4.5	0.20
0.22	5.0	0	7.2	0	10.0	0	14.5	0	23.9	3	12.2	0.22
0.24	5.4	0	7.9	0	10.9	0	15.8	1	2.0	3	19.8	0.24
0.26	5.9	0	8.6	0	11.8	0	17.1	1	4.2	4	3.5	0.26
0.28	6.3	0	9.2	0	12.7	0	18.4	1	6.4	4	11.2	0.28
0.30	6.8	0	9.9	0	13.6	0	19.7	1	8.5	4	18.8	0.30
0.32	7.2	0	10.5	0	14.5	0	21.0	1	10.7	5	2.5	0.32
0.34	7.7	0	11.2	0	15.4	0	22.3	1	12.9	5	10.1	0.34
0.36	8.1	0	11.8	0	16.3	0	23.6	1	15.0	5	17.8	0.36
0.38	8.6	0	12.5	0	17.2	1	1.0	1	17.2	6	1.4	0.38
0.40	9.1	0	13.2	0	18.1	1	2.3	1	19.4	6	9.1	0.40
0.42	9.5	0	13.8	0	19.0	1	3.6	1	21.5	6	16.7	0.42
0.44	10.0	0	14.5	0	19.9	1	4.9	1	23.7	7	0.4	0.44
0.46	10.4	0	15.1	0	20.8	1	6.2	2	1.9	7	8.0	0.46
0.48	10.9	0	15.8	0	21.7	1	7.5	2	4.0	7	15.7	0.48
0.50	11.3	0	16.4	0	22.7	1	8.8	2	6.2	7	23.3	0.50
0.52	11.8	0	17.1	0	23.6	1	10.2	2	8.4	8	7.0	0.52
0.54	12.2	0	17.8	1	0.5	1	11.5	2	10.5	8	14.7	0.54
0.56	12.7	0	18.4	1	1.4	1	12.8	2	12.7	8	22.3	0.56
0.58	13.1	0	19.1	1	2.3	1	14.1	2	14.9	9	6.0	0.58
0.60	13.6	0	19.7	1	3.2	1	15.4	2	17.1	9	13.6	0.60
0.62	14.0	0	20.4	1	4.1	1	16.7	2	19.2	9	21.3	0.62
0.64	14.5	0	21.0	1	5.0	1	18.0	2	21.4	10	4.9	0.64
0.66	14.9	0	21.7	1	5.9	1	19.4	2	23.6	10	12.6	0.66
0.68	15.4	0	22.4	1	6.8	1	20.7	3	1.7	10	20.2	0.68
0.70	15.8	0	23.0	1	7.7	1	22.0	3	3.9	11	3.9	0.70
0.72	16.3	0	23.7	1	8.6	1	23.3	3	6.1	11	11.5	0.72
0.74	16.7	1	0.3	1	9.5	2	0.6	3	8.2	11	19.2	0.74
0.76	17.2	1	1.0	1	10.4	2	1.9	3	10.4	12	2.8	0.76
0.78	17.6	1	1.7	1	11.3	2	3.2	3	12.6	12	10.5	0.78
0.80	18.1	1	2.3	1	12.2	2	4.5	3	14.7	12	18.1	0.80
0.82	18.5	1	3.0	1	13.2	2	5.9	3	16.9	13	1.8	0.82
0.84	19.0	1	3.6	1	14.1	2	7.2	3	19.1	13	9.5	0.84
0.86	19.5	1	4.3	1	15.0	2	8.5	3	21.2	13	17.1	0.86
0.88	19.9	1	4.9	1	15.9	2	9.8	3	23.4	14	0.8	0.88
0.90	20.4	1	5.6	1	16.8	2	11.1	4	1.6	14	8.4	0.90
0.92	20.8	1	6.3	1	17.7	2	12.4	4	3.7	14	16.1	0.92
0.94	21.3	1	6.9	1	18.6	2	13.7	4	5.9	14	23.7	0.94
0.96	21.7	1	7.6	1	19.5	2	15.1	4	8.1	15	7.4	0.96
0.98	22.2	1	8.2	1	20.4	2	16.4	4	10.3	15	15.0	0.98
1.00	22.6	1	8.9	1	21.3	2	17.7	4	12.4	15	22.7	1.00

Six Inner Satellites of Saturn.			Hyperion.			Iapetus.		
Fraction of a Revolution.	p^1	F	Time from Eastern Elongation.	p^1	F	Time from Eastern Elongation.	p^1	F
	°		d	°		d	°	
0.00	85.1	1.000	0.0	87.1	0.913	0	76.1	1.028
0.02	81.9	0.994	0.5	82.7	0.902	2	73.9	1.017
0.04	78.7	0.975	1.0	78.0	0.871	4	71.6	0.984
0.06	75.2	0.944	1.5	72.9	0.822	6	69.0	0.930
0.08	71.5	0.902	2.0	67.0	0.756	8	66.1	0.857
0.10	67.4	0.850	2.5	59.7	0.677	10	62.5	0.767
0.12	62.6	0.789	3.0	50.6	0.593	12	57.9	0.662
0.14	57.0	0.723	3.5	38.5	0.513	14	51.5	0.548
0.16	50.3	0.653	4.0	22.3	0.451	16	41.6	0.432
0.18	42.0	0.584	4.5	2.6	0.422	18	24.8	0.327
0.20	31.5	0.521	5.0	342.3	0.435	20	356.7	0.264
0.22	18.5	0.472	5.5	324.6	0.488	22	323.2	0.279
0.24	3.2	0.445	6.0	311.3	0.566	24	299.5	0.362
0.26	347.0	0.445	6.5	301.3	0.654	26	285.8	0.474
0.28	331.8	0.472	7.0	293.8	0.744	28	277.4	0.588
0.30	318.8	0.521	7.5	287.8	0.829	30	271.7	0.697
0.32	308.3	0.584	8.0	282.9	0.905	32	267.5	0.793
0.34	300.0	0.653	8.5	278.7	0.969	34	264.1	0.871
0.36	293.2	0.723	9.0	274.9	1.021	36	261.2	0.928
0.38	287.6	0.789	9.5	271.5	1.058	38	258.6	0.962
0.40	282.9	0.850	10.0	268.3	1.080	40	256.1	0.972
0.42	278.8	0.902	10.5	265.1	1.087	42	253.6	0.958
0.44	275.0	0.944	11.0	262.0	1.078	44	250.9	0.919
0.46	271.6	0.975	11.5	258.8	1.055	46	248.0	0.857
0.48	268.3	0.994	12.0	255.4	1.018	48	244.5	0.774
0.50	265.1	1.000	12.5	251.7	0.967	50	240.0	0.675
0.52	261.9	0.994	13.0	247.4	0.905	52	233.8	0.563
0.54	258.7	0.975	13.5	242.5	0.832	54	224.5	0.445
0.56	255.2	0.944	14.0	236.6	0.753	56	208.7	0.336
0.58	251.5	0.902	14.5	229.3	0.670	58	181.5	0.264
0.60	247.4	0.850	15.0	219.9	0.589	60	146.9	0.271
0.62	242.6	0.789	15.5	207.8	0.517	62	121.6	0.351
0.64	237.0	0.723	16.0	192.3	0.466	64	107.1	0.463
0.66	230.3	0.653	16.5	174.4	0.447	66	98.4	0.582
0.68	222.0	0.584	17.0	156.4	0.463	68	92.7	0.695
0.70	211.5	0.521	17.5	140.4	0.510	70	88.4	0.797
0.72	198.5	0.472	18.0	127.8	0.578	72	85.1	0.883
0.74	183.2	0.445	18.5	118.1	0.654	74	82.4	0.950
0.76	167.0	0.445	19.0	110.4	0.729	76	79.9	0.997
0.78	151.8	0.472	19.5	104.1	0.796	78	77.6	1.023
0.80	138.8	0.521	20.0	98.7	0.852	80	75.4	1.026
0.82	128.3	0.584	20.5	93.8	0.891			
0.84	120.0	0.653	21.0	89.3	0.911			
0.86	113.2	0.723	21.5	84.8	0.910			
0.88	107.6	0.789						
0.90	102.9	0.850						
0.92	98.8	0.902						
0.94	95.0	0.944						
0.96	91.6	0.975						
0.98	88.3	0.994						
1.00	85.1	1.000						

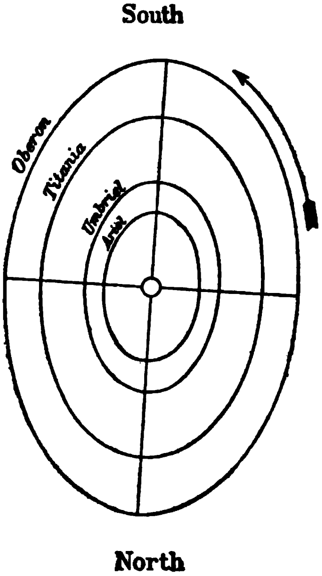
The fraction of a revolution is reckoned from the Eastern Elongation.
Position angle of satellite $p = p' + (P - P_0)$.

Apparent distance of satellite $s = F\frac{a(\rho)}{\rho}$.

Date.	Mimas.		Enceladus.		Tethys.		Dione.	
	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$
	°	″	°	″	°	″	°	″
Jan. 1	+1.0	30.7	+2.4	39.4	+3.2	48.8	+2.4	62.5
11	1.2	30.2	2.5	38.8	3.2	48.0	2.5	61.6
21	1.5	29.7	2.5	38.2	3.3	47.3	2.5	60.6
31	1.8	29.2	2.5	37.5	3.2	46.4	2.5	59.5
Feb. 10	2.0	28.7	2.5	36.8	3.2	45.6	2.5	58.4
20	+2.3	28.2	+2.5	36.2	+3.1	44.7	+2.5	57.3
Mar. 2	2.5	27.6	2.4	35.5	3.0	43.9	2.4	56.3
12	+2.8	27.2	2.3	34.9	+2.8	43.2	2.3	55.4
Aug. 19	−0.4	27.3	+0.1	35.1	−0.4	43.4	+0.1	55.7
29	0.8	27.8	0.0	35.7	0.5	44.2	0.0	56.6
Sept. 8	1.2	28.3	0.0	36.4	0.6	45.0	0.0	57.7
18	1.4	28.8	0.0	37.0	0.7	45.8	0.0	58.8
28	−1.6	29.4	−0.1	37.7	−0.7	46.7	0.0	59.8
Oct. 8	1.7	29.9	−0.1	38.4	0.8	47.5	0.0	60.9
18	1.8	30.4	0.0	39.1	0.8	48.3	0.0	61.9
28	1.8	30.9	0.0	39.6	0.8	49.0	0.0	62.8
Nov. 7	1.7	31.2	+0.1	40.1	0.7	49.6	+0.1	63.6
17	−1.6	31.5	+0.1	40.5	−0.7	50.1	+0.2	64.2
27	1.4	31.7	0.2	40.7	0.6	50.4	0.3	64.6
Dec. 7	1.2	31.8	0.3	40.8	0.5	50.5	0.4	64.7
17	0.9	31.7	0.4	40.7	0.4	50.4	0.4	64.5
27	−0.6	31.5	+0.5	40.5	−0.4	50.0	+0.5	64.2

Date.	Rhea.		Titan.		Hyperion.		Iapetus.	
	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$
	°	″	°	″	°	″	°	″
Jan. 1	+2.7	87.3	+2.4	202	+1.9	245	−1.1	589
11	2.7	86.0	2.4	199	1.9	241	1.1	580
21	2.8	84.6	2.4	196	2.0	237	1.2	571
31	2.8	83.1	2.4	193	2.0	233	1.1	561
Feb. 10	2.7	81.6	2.4	189	2.0	229	1.1	551
20	+2.7	80.1	+2.4	186	+1.9	225	−1.1	541
Mar. 2	2.6	78.7	2.3	182	1.9	221	1.1	531
12	2.6	77.4	2.2	179	+1.8	217	−1.1	522
Aug. 19	+0.5	77.8	+0.2	180	−0.2	218	+0.2	525
29	0.4	79.1	0.1	183	0.3	222	0.3	534
Sept. 8	0.3	80.6	0.1	187	0.3	226	0.3	544
18	0.3	82.0	0.1	190	0.4	230	0.4	554
28	+0.3	83.6	+0.1	194	−0.4	235	+0.4	564
Oct. 8	0.3	85.1	0.1	197	0.4	239	0.4	574
18	0.3	86.5	0.1	200	0.3	243	0.4	584
28	0.3	87.8	0.1	203	0.3	246	0.3	593
Nov. 7	0.4	88.8	0.2	206	0.2	249	0.3	600
17	+0.5	89.7	+0.2	208	−0.2	252	+0.2	606
27	0.6	90.2	0.3	209	−0.1	253	+0.1	609
Dec. 7	0.7	90.4	0.4	209	0.0	254	0.0	610
17	0.8	90.1	0.5	209	+0.1	253	−0.1	609
27	+0.8	89.6	+0.6	208	+0.2	251	−0.2	605

APPARENT ORBITS OF THE SATELLITES OF URANUS AT DATE OF OPPOSITION, JULY 28, 1913, AS SEEN IN AN INVERTING TELESCOPE.



Apparent Apsides.

Date.	Position Angle.	App. Distances Ariel.	App. Distances Umbriel.
	°	"	"
May 18,	355.6	13.6	18.9
Aug. 6,	356.8	14.0	19.6
Oct. 25,	357.6	13.4	18.6

Apparent Apsides.

Date.	Position Angle.	App. Distances Titania.	App. Distances Oberon.
	°	"	"
May 18,	355.6	31.1	41.5
Aug. 6,	356.8	32.1	42.9
Oct. 25,	357.6	30.6	40.8

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

ARIEL.		UMBRIEL.		TITANIA.		OBERON.
North.	South.	North.	South.	North.	South.	North and South.
d h	d h	d h	d h	d h	d h	d h
May 15 9.0	May 16 15.2	May 1 23.4	May 4 1.1	Apr. 28 1.6	May 2 10.1	May 22 10.0 N.
22 22.4	24 4.7	10 6.3	12 8.0	May 6 18.5	11 3.0	29 3.6 S.
30 11.9	31 18.1	18 13.2	20 14.9	15 11.4	19 19.9	June 4 21.1 N.
June 7 1.3	June 8 7.6	26 20.1	28 21.8	24 4.4	28 12.8	11 14.7 S.
14 14.8	15 21.0	June 4 3.0	June 6 4.8	June 1 21.3	June 6 5.8	18 8.3 N.
22 4.2	23 10.5	12 9.9	14 11.7	10 14.3	14 22.7	25 1.9 S.
29 17.7	July 1 0.0	20 16.9	22 18.6	19 7.2	23 15.7	July 1 19.5 N.
July 7 7.2	8 13.4	28 23.8	July 1 1.5	28 0.2	July 2 8.7	8 13.1 S.
14 20.7	16 2.9	July 7 6.7	9 8.4	July 6 17.2	11 1.6	15 6.7 N.
22 10.1	23 16.4	15 13.7	17 15.4	15 10.1	19 18.6	22 0.3 S.
29 23.6	31 5.9	23 20.6	25 22.3	24 3.1	28 11.6	28 17.9 N.
Aug. 6 13.1	Aug. 7 19.4	Aug. 1 3.5	Aug. 3 5.3	Aug. 1 20.1	Aug. 6 4.6	Aug. 4 11.6 S.
14 2.6	15 8.8	9 10.5	11 12.2	10 13.1	14 21.6	11 5.2 N.
21 16.1	22 22.3	17 17.4	19 19.2	19 6.1	23 14.6	17 22.8 S.
29 5.6	30 11.8	26 0.4	28 2.1	27 23.1	Sept. 1 7.6	24 16.4 N.
Sept. 5 19.0	Sept. 7 1.3	Sept. 3 7.3	Sept. 5 9.1	Sept. 5 16.1	10 0.6	31 10.0 S.
13 8.5	14 14.8	11 14.3	13 16.0	14 9.1	18 17.6	Sept. 7 3.7 N.
20 22.0	22 4.3	19 21.2	21 23.0	23 2.1	27 10.6	13 21.3 S.
28 11.5	29 17.8	28 4.2	30 5.9	Oct. 1 19.0	Oct. 6 3.5	20 14.9 N.
Oct. 6 1.0	Oct. 7 7.2	Oct. 6 11.1	Oct. 8 12.9	10 12.0	14 20.5	27 8.5 S.
13 14.5	14 20.7	14 18.1	16 19.8	19 5.0	23 13.4	Oct. 4 2.0 N.
21 4.0	22 10.2	23 1.0	25 2.7	27 21.9	Nov. 1 6.4	10 19.6 S.
28 17.5	29 23.7	31 7.9	Nov. 2 9.7	Nov. 5 14.9	9 23.3	17 13.2 N.
Nov. 5 6.9	Nov. 6 13.2	Nov. 8 14.9	10 16.6	14 7.8	18 16.3	24 6.8 S.
12 20.4	14 2.7	16 21.8	18 23.5	23 0.7	27 9.2	31 0.3 N.

For Ariel every third elongation is given, and for Umbriel every alternate one; the intermediate ones may be found by adding multiples of the period of the satellite.

Sidereal Period of Ariel, $2^d\ 12^h.489$; of Umbriel, $4^d\ 3^h.460$; of Titania, $8^d\ 16^h.942$; of Oberon, $13^d\ 11^h.119$.

	Fractions of the Period of Revolution.								Fraction of a Revolution.	p^1	F
Fraction of a Revolution.	Ariel.		Umbriel.		Titania.		Oberon.				
	d	h	d	h	d	h	d	h		°	
0.00	0	0.0	0	0.0	0	0.0	0	0.0	0.00	356.6	1.000
0.02	0	1.2	0	2.0	0	4.2	0	6.5	0.02	1.3	0.995
0.04	0	2.4	0	4.0	0	8.4	0	12.9	0.04	6.0	0.982
0.06	0	3.6	0	6.0	0	12.5	0	19.4	0.06	11.0	0.960
0.08	0	4.8	0	8.0	0	16.7	1	1.8	0.08	16.2	0.930
0.10	0	6.0	0	10.0	0	20.9	1	8.3	0.10	21.8	0.894
0.12	0	7.3	0	11.9	1	1.1	1	14.8	0.12	27.8	0.852
0.14	0	8.5	0	13.9	1	5.3	1	21.2	0.14	34.6	0.809
0.16	0	9.7	0	15.9	1	9.4	2	3.7	0.16	42.1	0.764
0.18	0	10.9	0	17.9	1	13.6	2	10.2	0.18	50.5	0.723
0.20	0	12.1	0	19.9	1	17.8	2	16.6	0.20	59.9	0.687
0.22	0	13.3	0	21.9	1	22.0	2	23.1	0.22	70.2	0.661
0.24	0	14.5	0	23.9	2	2.1	3	5.5	0.24	81.1	0.647
0.26	0	15.7	1	1.9	2	6.3	3	12.0	0.26	92.2	0.647
0.28	0	16.9	1	3.8	2	10.5	3	18.5	0.28	103.1	0.661
0.30	0	18.1	1	5.8	2	14.7	4	0.9	0.30	113.4	0.687
0.32	0	19.4	1	7.8	2	18.9	4	7.4	0.32	122.8	0.723
0.34	0	20.6	1	9.8	2	23.0	4	13.9	0.34	131.2	0.764
0.36	0	21.8	1	11.8	3	3.2	4	20.3	0.36	138.7	0.809
0.38	0	23.0	1	13.8	3	7.4	5	2.8	0.38	145.4	0.852
0.40	1	0.2	1	15.8	3	11.6	5	9.2	0.40	151.5	0.894
0.42	1	1.4	1	17.8	3	15.8	5	15.7	0.42	157.1	0.930
0.44	1	2.6	1	19.8	3	19.9	5	22.2	0.44	162.3	0.960
0.46	1	3.8	1	21.8	4	0.1	6	4.6	0.46	167.2	0.982
0.48	1	5.0	1	23.7	4	4.3	6	11.1	0.48	172.0	0.995
0.50	1	6.2	2	1.7	4	8.5	6	17.6	0.50	176.6	1.000
0.52	1	7.5	2	3.7	4	12.6	7	0.0	0.52	181.3	0.995
0.54	1	8.7	2	5.7	4	16.8	7	6.5	0.54	186.0	0.982
0.56	1	9.9	2	7.7	4	21.0	7	12.9	0.56	191.0	0.960
0.58	1	11.1	2	9.7	5	1.2	7	19.4	0.58	196.2	0.930
0.60	1	12.3	2	11.7	5	5.4	8	1.9	0.60	201.8	0.894
0.62	1	13.5	2	13.7	5	9.5	8	8.3	0.62	207.8	0.852
0.64	1	14.7	2	15.7	5	13.7	8	14.8	0.64	214.6	0.809
0.66	1	15.9	2	17.6	5	17.9	8	21.3	0.66	222.1	0.764
0.68	1	17.1	2	19.6	5	22.1	9	3.7	0.68	230.5	0.723
0.70	1	18.3	2	21.6	6	2.3	9	10.2	0.70	239.9	0.687
0.72	1	19.6	2	23.6	6	6.4	9	16.6	0.72	250.2	0.661
0.74	1	20.8	3	1.6	6	10.6	9	23.1	0.74	261.1	0.647
0.76	1	22.0	3	3.6	6	14.8	10	5.6	0.76	272.2	0.647
0.78	1	23.2	3	5.6	6	19.0	10	12.0	0.78	283.1	0.661
0.80	2	0.4	3	7.6	6	23.2	10	18.5	0.80	293.4	0.687
0.82	2	1.6	3	9.6	7	3.3	11	1.0	0.82	302.8	0.723
0.84	2	2.8	3	11.5	7	7.5	11	7.4	0.84	311.2	0.764
0.86	2	4.0	3	13.5	7	11.7	11	13.9	0.86	318.7	0.809
0.88	2	5.2	3	15.5	7	15.9	11	20.3	0.88	325.4	0.852
0.90	2	6.4	3	17.5	7	20.0	12	2.8	0.90	331.5	0.894
0.92	2	7.7	3	19.5	8	0.2	12	9.3	0.92	337.1	0.930
0.94	2	8.9	3	21.5	8	4.4	12	15.7	0.94	342.3	0.960
0.96	2	10.1	3	23.5	8	8.6	12	22.2	0.96	347.2	0.982
0.98	2	11.3	4	1.5	8	12.8	13	4.7	0.98	352.0	0.995
1.00	2	12.5	4	3.5	8	16.9	13	11.1	1.00	356.6	1.000

The fraction of a revolution is reckoned from the Northern Elongation.
Position angle of satellite $p = p^1 + (P - P_0)$.

Apparent distance of satellite $s = F\frac{a(\rho)}{\rho}$.

Date.		$P-P_0$	$\frac{a(\rho)}{\rho}$ Ariel.	$\frac{a(\rho)}{\rho}$ Umbriel.	$\frac{a(\rho)}{\rho}$ Titania.	$\frac{a(\rho)}{\rho}$ Oberon.	Date.		$P-P_0$	$\frac{a(\rho)}{\rho}$ Ariel.	$\frac{a(\rho)}{\rho}$ Umbriel.	$\frac{a(\rho)}{\rho}$ Titania.	$\frac{a(\rho)}{\rho}$ Oberon.
		°	"	"	"	"			°	"	"	"	"
Mar.	29	−0.6	13.0	18.3	29.8	39.8	July	27	0.0	14.0	19.7	32.1	42.9
Apr.	3	0.7	13.0	18.4	29.9	40.0	Aug.	1	+0.1	14.0	19.7	32.1	42.9
	8	0.8	13.1	18.4	30.0	40.2		6	0.2	14.0	19.7	32.1	42.9
	13	0.8	13.2	18.5	30.1	40.3		11	0.3	14.0	19.7	32.0	42.9
	18	0.9	13.2	18.6	30.3	40.5		16	0.4	14.0	19.6	32.0	42.8
	23	−0.9	13.3	18.7	30.4	40.6		21	+0.5	13.9	19.6	32.0	42.7
	28	1.0	13.3	18.7	30.5	40.8		26	0.6	13.9	19.6	31.9	42.6
May	3	1.0	13.4	18.8	30.6	41.0		31	0.6	13.9	19.5	31.8	42.5
	8	1.0	13.4	18.9	30.8	41.2	Sept.	5	0.7	13.8	19.5	31.7	42.4
	13	1.0	13.5	19.0	30.8	41.3		10	0.8	13.8	19.4	31.6	42.3
	18	−1.0	13.5	19.1	31.0	41.5		15	+0.8	13.7	19.4	31.5	42.2
	23	1.0	13.6	19.1	31.2	41.7		20	0.9	13.7	19.3	31.4	42.0
	28	0.9	13.6	19.2	31.3	41.8		25	0.9	13.7	19.2	31.3	41.9
June	2	0.9	13.7	19.3	31.4	42.0		30	1.0	13.6	19.1	31.2	41.7
	7	0.9	13.7	19.3	31.5	42.1	Oct.	5	1.0	13.5	19.1	31.1	41.5
	12	−0.8	13.8	19.4	31.6	42.3		10	+1.0	13.5	19.0	30.9	41.4
	17	0.7	13.8	19.5	31.7	42.4		15	1.0	13.4	18.9	30.8	41.2
	22	0.6	13.9	19.5	31.8	42.5		20	0.9	13.4	18.8	30.7	41.0
	27	0.6	13.9	19.6	31.9	42.6		25	0.9	13.3	18.8	30.5	40.8
July	2	0.5	13.9	19.6	31.9	42.7		30	0.9	13.3	18.7	30.4	40.7
	7	−0.4	14.0	19.6	32.0	42.8	Nov.	4	+0.8	13.2	18.6	30.3	40.5
	12	0.3	14.0	19.7	32.0	42.8		9	0.8	13.1	18.5	30.1	40.3
	17	0.2	14.0	19.7	32.1	42.9		14	0.8	13.1	18.4	30.0	40.1
	22	−0.1	14.0	19.7	32.1	42.9		19	+0.7	13.0	18.4	29.9	40.0

SATELLITE OF NEPTUNE, 1913.

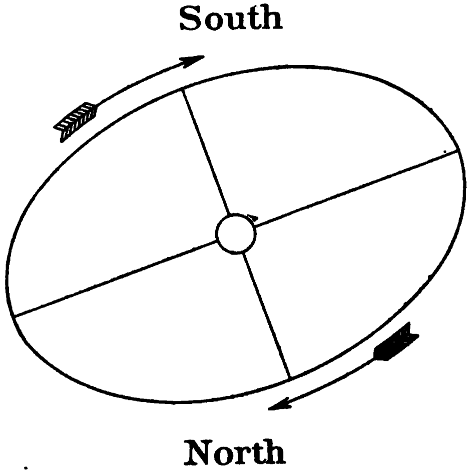
Time from Eastern Elongation.		p^1	F	Time from Eastern Elongation.		p^1	F
d	h	°		d	h	°	
0	0	110.0	1.000	3	0	287.6	0.999
0	3	105.0	0.995	3	3	282.5	0.989
0	6	99.9	0.980	3	6	277.3	0.969
0	9	94.6	0.955	3	9	271.8	0.940
0	12	88.9	0.922	3	12	265.9	0.904
0	15	82.8	0.883	3	15	259.5	0.862
0	18	76.0	0.839	3	18	252.4	0.816
0	21	68.5	0.793	3	21	244.5	0.770
1	0	60.1	0.748	4	0	235.6	0.727
1	3	50.6	0.708	4	3	225.6	0.691
1	6	40.1	0.676	4	6	214.6	0.665
1	9	28.8	0.657	4	9	203.1	0.654
1	12	17.1	0.653	4	12	191.4	0.658
1	15	5.6	0.665	4	15	180.1	0.676
1	18	354.7	0.690	4	18	169.6	0.707
1	21	344.7	0.726	4	21	160.1	0.747
2	0	335.7	0.770	5	0	151.7	0.792
2	3	327.7	0.815	5	3	144.2	0.838
2	6	320.6	0.861	5	6	137.4	0.882
2	9	314.2	0.903	5	9	131.3	0.922
2	12	308.4	0.940	5	12	125.6	0.955
2	15	302.9	0.968	5	15	120.3	0.980
2	18	297.6	0.988	5	18	115.1	0.995
2	21	292.6	0.999	5	21	110.1	1.000

Date.		$P-P_0$	$\frac{a(\rho)}{\rho}$	Date.		$P-P_0$	$\frac{a(\rho)}{\rho}$
		°	"			°	"
Jan.	0	+0.5	16.9	Apr	30	−1.5	16.2
	5	0.4	16.9	May	5	1.4	16.1
	10	+0.2	16.9		10	1.3	16.1
	15	0.0	16.9		15	−1.2	16.0
	20	−0.2	16.9	Sept.	26	+3.9	16.1
	25	−0.3	16.9	Oct.	1	+4.0	16.1
	30	0.5	16.8		6	4.1	16.2
Feb.	4	0.6	16.8		11	4.2	16.2
	9	0.8	16.8		16	4.2	16.3
	14	1.0	16.8		21	4.3	16.3
	19	−1.1	16.8		26	+4.3	16.4
	24	1.2	16.7		31	4.3	16.4
Mar.	1	1.3	16.7	Nov.	5	4.3	16.5
	6	1.4	16.7		10	4.3	16.5
	11	1.5	16.6		15	4.3	16.5
	16	−1.6	16.6		20	+4.2	16.6
	21	1.7	16.5		25	4.1	16.6
	26	1.7	16.5		30	4.1	16.7
	31	1.7	16.4	Dec.	5	4.0	16.7
Apr.	5	1.7	16.4		10	3.8	16.7
	10	−1.7	16.4		15	+3.7	16.8
	15	1.7	16.3		20	3.6	16.8
	20	1.6	16.3		25	3.5	16.8
	25	−1.6	16.2		30	+3.3	16.9

Position angle of satellite $p = p^1 + (P - P_0)$.

Apparent distance of satellite $s = F\frac{a(\rho)}{\rho}$.

APPARENT ORBIT OF THE SATELLITE OF NEPTUNE AT DATE OF OPPOSITION, JANUARY 14, 1913, AS SEEN IN AN INVERTING TELESCOPE.



Date.	Position Angle of Apsis.	Apparent Distance at Apsis.
	°	″
Jan. 22,	109.8	16.8
May 2,	108.6	16.1
Oct. 9,	114.2	16.1
Dec. 28,	113.4	16.8

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

East.			West.			East.			West.			East.			West.		
	d	h		d	h		d	h		d	h		d	h		d	h
Jan.	5	12.5	Jan.	8	11.1	Mar.	28	20.1	Mar.	31	18.6	Oct.	14	13.1	Oct.	17	11.6
	11	9.6		14	8.2	Apr.	3	17.1	Apr.	6	15.6		20	10.1		23	8.6
	17	6.8		20	5.3		9	14.2		12	12.7		26	7.2		29	5.7
	23	3.9		26	2.4		15	11.2		18	9.7	Nov.	1	4.2	Nov.	4	2.7
	29	1.0		31	23.6		21	8.2		24	6.8		7	1.2		9	23.7
Feb.	3	22.2	Feb.	6	20.7		27	5.3		30	3.8		12	22.3		15	20.8
	9	19.3		12	17.8	May	3	2.3	May	6	0.8		18	19.3		21	17.8
	15	16.4		18	14.9		8	23.4		11	21.9		24	16.4		27	14.9
	21	13.5		24	12.0		14	20.4		17	18.9		30	13.5	Dec.	3	12.0
	27	10.6	Mar.	2	9.2		20	17.4		23	15.9	Dec.	6	10.6		9	9.1
Mar.	5	7.7		8	6.3		. . .	. .		. . .	. .		12	7.7		15	6.2
	11	4.8		14	3.4	Sept.	26	22.2	Sept.	29	20.7		18	4.8		21	3.3
	17	1.9		20	0.5	Oct.	2	19.1	Oct.	5	17.6		24	1.9		27	0.4
	22	23.0		25	21.5		8	16.1		11	14.6		29	23.0		32	21.5

The above times are the instants of each passage of the satellite through the apsis of its apparent orbit. The position of the satellite at any other time may be found by measuring around the orbit from the apsis last passed through, bearing in mind that the radius vector of the satellite describes equal areas in equal times.

The sidereal period of the satellite of Neptune is $5^d\ 21^h.044$.

Note.—In the preceding diagrams the central circle represents the planet and is on the same scale as the orbits.

WASHINGTON MEAN TIME.

PLANETARY CONFIGURATIONS.

	d	h	m				°	'
Jan.	4	21	28	☌ ☿ ☾	....	☿ +	5	41
	5	2	28	☌ ♂ ☾	....	♂ +	4	25
	5	10	26	☌ ♃ ☾	....	♃ +	5	11
	7	23	20	☌ ♅ ☾	....	♅ +	4	5
	9	3	–	☌ ☿ ♂	....	☿ +	0	46
	10	17	21	☌ ♀ ☾	....	♀ +	1	28
	10	21	–	☿	in ☋			
	10	22	–	☌ ☿ ♃	....	☿ —	0	13
	13	4	–	☌ ♂ ♃	....	♂ —	0	47
	14	15	–	☍ ♆ ☉				
	17	13	38	☌ ♄ ☾	....	♄ —	6	14
	21	3	–	☿	in Aphelion.			
	21	8	58	☌ ♆ ☾	....	♆ —	5	24
	23	9	–	☌ ♅ ☉				
	28	15	–	♄	Stationary.			
	28	22	–	♀	in ☊			
	31	14	–	☌ ☿ ♅	....	☿ —	1	23
Feb.	2	3	36	☌ ♃ ☾	....	♃ +	5	17
	3	1	30	☌ ♂ ☾	....	♂ +	4	12
	4	8	48	☌ ♅ ☾	....	♅ +	4	1
	4	23	6	☌ ☿ ☾	....	☿ +	2	9
	9	19	5	☌ ♀ ☾	....	♀ +	0	51
	10	12	–	☿	Greatest Hel. Lat. S.			
	11	21	–	♀	Great. elong. E.		46	43
	12	6	–	☌ ☿ ☉	Superior.			
	13	22	25	☌ ♄ ☾	....	♄ —	6	20
	16	1	–	□ ♄ ☉				
	17	19	3	☌ ♆ ☾	....	♆ —	5	30
	25	12	–	☌ ♂ ♅	....	♂ —	0	26
Mar.	1	12	–	☿	in ☊			
	1	19	16	☌ ♃ ☾	....	♃ +	5	22
	3	12	–	♀	in Perihelion.			
	3	17	41	☌ ♅ ☾	....	♅ +	4	2
	4	3	22	☌ ♂ ☾	....	♂ +	3	19
	6	3	–	☿	in Perihelion.			
	8	21	45	☌ ☿ ☾	....	☿ +	1	29
	10	14	–	☿	Great. elong. E.		18	19
	11	3	22	☌ ♀ ☾	....	♀ +	2	1
	13	7	28	☌ ♄ ☾	....	♄ —	6	23
	16	10	–	☿	Greatest Hel. Lat. N.			
	17	3	35	☌ ♆ ☾	....	♆ —	5	34
	17	11	–	☿	Stationary.			
	18	23	–	♀	Greatest brilliancy.			
	20	12	10	☉	enters ♈, Spring com.			
	21	–	–	☾	Tot. ec. Part. vis. at W.			
	25	10	–	♀	Greatest Hel. Lat. N.			
	27	11	–	☌ ☿ ☉	Inferior.			
	29	9	21	☌ ♃ ☾	....	♃ +	5	19
	31	2	27	☌ ♅ ☾	....	♅ +	4	0
Apr.	2	8	23	☌ ♂ ☾	....	♂ +	1	34
	2	15	–	♀	Stationary.			
Apr.	3	7	–	♆	Stationary.			
	4	16	46	☌ ☿ ☾	....	☿ +	1	29
	6	–	–	☉	Par. ec. invis. at Wash.			
	6	7	–	□ ♃ ☉				
	8	0	3	☌ ♀ ☾	....	♀ +	4	1
	8	21	–	☿	in ☋			
	8	22	–	☿	Stationary.			
	9	17	33	☌ ♄ ☾	....	♄ —	6	22
	13	2	–	□ ♆ ☉				
	13	10	10	☌ ♆ ☾	....	♆ —	5	31
	19	2	–	☿	in Aphelion.			
	23	10	–	♂	Greatest Hel. Lat. S.			
	24	8	–	☌ ♀ ☉	Inferior.			
	24	11	–	☿	Great. elong. W.		27	12
	25	21	5	☌ ♃ ☾	....	♃ +	5	9
	27	11	16	☌ ♅ ☾	....	♅ +	3	52
	27	16	–	□ ♅ ☉				
May	1	15	16	☌ ♂ ☾	....	♂ —	0	48
	3	14	55	☌ ☿ ☾	....	☿ —	4	49
	4	6	51	☌ ♀ ☾	....	♀ +	1	26
	5	4	–	♃	Stationary.			
	7	5	27	☌ ♄ ☾	....	♄ —	6	20
	8	10	–	☌ ☿ ♀	....	☿ —	5	41
	9	11	–	☿	Greatest Hel. Lat. S.			
	10	16	11	☌ ♆ ☾	....	♆ —	5	21
	12	4	–	♅	Stationary.			
	13	12	–	♀	Stationary.			
	17	22	–	♂	in Perihelion.			
	20	11	–	♀	in ☋			
	23	5	15	☌ ♃ ☾	....	♃ +	4	56
	24	19	42	☌ ♅ ☾	....	♅ +	3	38
	25	2	–	♃	in ☋			
	28	11	–	☿	in ☊			
	28	20	–	☌ ♄ ☉				
	30	10	–	♀	Greatest brilliancy.			
	30	21	17	☌ ♂ ☾	....	♂ —	3	10
	31	1	–	☌ ☿ ♄	....	☿ +	2	4
	31	22	56	☌ ♀ ☾	....	♀ —	4	38
June	1	6	–	☌ ☿ ☉	Superior.			
	2	2	–	☿	in Perihelion.			
	3	19	17	☌ ♄ ☾	....	♄ —	6	22
	4	10	56	☌ ☿ ☾	....	☿ —	3	48
	6	23	31	☌ ♆ ☾	....	♆ —	5	9
	12	9	–	☿	Greatest Hel. Lat. N.			
	19	9	18	☌ ♃ ☾	....	♃ +	4	47
	21	3	0	☌ ♅ ☾	....	♅ +	3	27
	21	8	1	☉	enters ♋, Summer com.			
	23	17	–	☌ ☿ ♆	....	☿ +	2	10
	23	21	–	♀	in Aphelion.			
	28	23	56	☌ ♂ ☾	....	♂ —	4	51
	30	1	56	☌ ♀ ☾	....	♀ —	7	44

PLANETARY CONFIGURATIONS.

	d	h	m			°	′
July	1	10	17	☌ ♄ ☾	. . . . . . ♄ —	6	30
	3	7	–	⊕	in Aphelion.		
	3	10	–	♀	Great. elong. W.	45	44
	4	9	9	☌ ♆ ☾	. . . . . . ♆ —	5	0
	4	22	–	☍ ♃ ☉			
	5	8	31	☌ ☿ ☾	. . . . . . ☿ —	3	49
	5	20	–	☿	in ☋		
	6	22	–	☿	Great. elong. E.	26	13
	16	1	–	☿	in Aphelion.		
	16	8	–	♀	Greatest Hel. Lat. S.		
	16	10	21	☌ ♃ ☾	. . . . . . ♃ +	4	47
	18	8	–	☌ ♆ ☉			
	18	8	41	☌ ⛢ ☾	. . . . . . ⛢ +	3	24
	20	1	–	☿	Stationary.		
	21	8	–	☌ ♀ ♄	. . . . . . ♀ —	1	18
	27	22	4	☌ ♂ ☾	. . . . . . ♂ —	5	41
	28	15	–	☍ ⛢ ☉			
	29	1	3	☌ ♄ ☾	. . . . . . ♄ —	6	42
	29	14	22	☌ ♀ ☾	. . . . . . ♀ —	7	40
	31	20	36	☌ ♆ ☾	. . . . . . ♆ —	4	59
Aug.	1	21	11	☌ ☿ ☾	. . . . . . ☿ —	8	53
	3	18	–	☌ ☿ ☉	Inferior.		
	5	10	–	☿	Greatest Hel. Lat. S.		
	12	11	21	☌ ♃ ☾	. . . . . . ♃ +	4	52
	13	9	–	☿	Stationary.		
	14	13	1	☌ ⛢ ☾	. . . . . . ⛢ +	3	27
	21	19	–	☿	Great. elong. W.	18	26
	24	0	–	☌ ♂ ♄	. . . . . . ♂ +	1	9
	24	11	–	☿	in ☊		
	25	13	46	☌ ♄ ☾	. . . . . . ♄ —	6	53
	25	15	21	☌ ♂ ☾	. . . . . . ♂ —	5	43
	28	6	35	☌ ♀ ☾	. . . . . . ♀ —	5	25
	28	8	30	☌ ♆ ☾	. . . . . . ♆ —	5	0
	29	1	–	☿	in Perihelion.		
	29	7	–	☌ ♀ ♆	. . . . . . ♀ —	0	18
	30	0	41	☌ ☿ ☾	. . . . . . ☿ —	1	54
	31	–	–	☉	Par. ec. invis. at Wash.		
Sept.	3	21	–	♃	Stationary.		
	8	8	–	☿	Great. Hel. Lat. N.		
	8	15	38	☌ ♃ ☾	. . . . . . ♃ +	4	56
	10	11	–	□ ♄ ☉			
	10	15	–	♀	in ☊		
	10	17	5	☌ ⛢ ☾	. . . . . . ⛢ +	3	35
	14	–	–	☾	Tot. ec. Beg. vis. at W.		
	15	22	–	☌ ☿ ☉	Superior.		
	17	18	–	♂	in ☊		
	21	22	54	☌ ♄ ☾	. . . . . . ♄ —	6	59
	22	22	45	☉	enters ♎, Autumn com.		
	23	3	14	☌ ♂ ☾	. . . . . . ♂ —	5	6
	24	18	59	☌ ♆ ☾	. . . . . . ♆ —	5	0
	27	3	26	☌ ♀ ☾	. . . . . . ♀ —	1	20
	29	–	–	☉	Par. ec. invis. at Wash.		

	d	h	m			°	′
Sept.	30	7	–	♄	Stationary.		
	30	7	54	☌ ☿ ☾	. . . . . . ☿ +	2	35
Oct.	1	19	–	☿	in ☋		
	1	22	–	□ ♂ ☉			
	2	9	–	□ ♃ ☉			
	6	1	13	☌ ♃ ☾	. . . . . . ♃ +	4	51
	7	22	29	☌ ⛢ ☾	. . . . . . ⛢ +	3	35
	12	1	–	☿	in Aphelion.		
	13	8	–	⛢	Stationary.		
	14	5	–	♀	in Perihelion.		
	19	4	10	☌ ♄ ☾	. . . . . . ♄ —	6	56
	21	7	59	☌ ♂ ☾	. . . . . . ♂ —	3	55
	21	12	–	□ ♆ ☉			
	22	2	46	☌ ♆ ☾	. . . . . . ♆ —	4	53
	27	0	–	□ ⛢ ☉			
	27	3	23	☌ ♀ ☾	. . . . . . ♀ +	3	18
	30	15	10	☌ ☿ ☾	. . . . . . ☿ +	2	2
	31	8	–	♆	Stationary.		
Nov.	1	9	–	☿	Greatest Hel. Lat. S.		
	1	11	–	☿	Great. elong. E.	23	34
	2	16	9	☌ ♃ ☾	. . . . . . ♃ +	4	35
	4	6	24	☌ ⛢ ☾	. . . . . . ⛢ +	3	26
	5	2	–	♀	Great. Hel. Lat. N.		
	12	6	–	☿	Stationary.		
	15	7	16	☌ ♄ ☾	. . . . . . ♄ —	6	49
	18	1	58	☌ ♂ ☾	. . . . . . ♂ —	2	23
	18	8	13	☌ ♆ ☾	. . . . . . ♆ —	4	40
	20	10	–	☿	in ☊		
	22	13	–	☌ ☿ ☉	Inferior.		
	25	0	–	☿	in Perihelion.		
	26	2	25	☌ ♀ ☾	. . . . . . ♀ +	5	41
	26	18	24	☌ ☿ ☾	. . . . . . ☿ +	6	43
	26	19	–	♂	Stationary.		
	30	10	57	☌ ♃ ☾	. . . . . . ♃ +	4	12
Dec.	1	16	53	☌ ⛢ ☾	. . . . . . ⛢ +	3	9
	1	22	–	☿	Stationary.		
	2	2	–	☌ ☿ ♀	. . . . . . ☿ +	1	35
	5	7	–	☿	Greatest Hel. Lat. N.		
	6	16	–	☍ ♄ ☉			
	10	9	–	☿	Great. elong. W.	21	2
	12	10	50	☌ ♄ ☾	. . . . . . ♄ —	6	45
	15	4	49	☌ ♂ ☾	. . . . . . ♂ —	0	59
	15	13	28	☌ ♆ ☾	. . . . . . ♆ —	4	29
	21	17	27	☉	enters ♑, Winter com.		
	25	15	15	☌ ☿ ☾	. . . . . . ☿ +	5	26
	26	0	49	☌ ♀ ☾	. . . . . . ♀ +	5	13
	28	7	24	☌ ♃ ☾	. . . . . . ♃ +	3	46
	28	18	–	☿	in ☋		
	29	4	37	☌ ⛢ ☾	. . . . . . ⛢ +	2	53
	31	4	–	♀	in ☋		
	31	13	–	♂	nearest ⊕		

No.	Place.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (*Meters*).	Log ρ (*Including altitude*).	Longitude from Washington.
		° ′ ″	′ ″			h m s
1	Abbadia, France .	+43 22 52.2	−11 39.2	69	9.999 313	− 5 1 15.7
2	Adelaide	−34 55 38	+10 56.8	43	9.999 523	+ 9 37 23.92
3	Albany, N. Y. . .	+42 39 12.7	−11 38.0	67	9.999 331	− 0 13 9.0
4	Algiers	+36 47 50	−11 11.3	342	9.999 497	− 5 20 24.33
5	Allegheny, Pa. . .	+40 28 58.0	−11 31.4	384	9.999 409	+ 0 11 49.61
6	Amherst, Mass. .	+42 21 56.5	−11 37.3	110	9.999 341	− 0 18 9.85
7	Ann Arbor, Mich. .	+42 16 48.0	−11 37.0	285	9.999 355	+ 0 26 39.41
8	Appleton, Wis. .	+44 15 39	−11 40.1	238	9.999 301	+ 0 45 20.11
9	Arcetri	+43 45 14.6	−11 39.7	184	9.999 310	− 5 53 17.12
10	Arequipa, Peru .	−16 22 28.0	+ 6 17.8	2452	0.000 051	− 0 22 4.05
11	Armagh, Ireland .	+54 21 12.7	−11 4.2	61	9.999 033	− 4 41 40.4
12	Athens	+37 58 20.7	−11 18.9	107	9.999 452	− 6 43 8.70
13	Baltimore, Md. .	+39 17 48	−11 25.5	75	9.999 417	− 0 1 49.8
14	Bamberg, Bavaria.	+49 53 6.0	−11 30.7	300	9.999 161	− 5 51 49.43
15	Barcelona, Spain .	+41 25 18	−11 34.7	420	9.999 387	− 5 16 43.8
16	Bayswater . . .	−31 55 13	+10 27.8	30	9.999 593	+11 8 6
17	Beloit, Wis. . . .	+42 30 8.4	−11 37.6	. . .	9.999 331	+ 0 47 51.5
18	Bergen, Norway .	+60 23 54	−10 2.7	. . .	9.998 888	− 5 29 28.53
19	Berkeley, Cal. . .	+37 52 23.6	−11 18.3	97	9.999 455	+ 3 0 46.94
20	Berlin, Prussia . .	+52 30 16.7	−11 17.1	47	9.999 078	− 6 1 50.63
21	Berlin, Prussia . .	+52 31 30.7	−11 17.0	. . .	9.999 075	− 6 1 43.23
22	Berlin, Prussia . .	+52 29 7	−11 17.3	38	9.999 078	− 6 2 10.0
23	Berne, Switzerland	+46 57 8.7	−11 39.0	573	9.999 255	− 5 38 1.51
24	Besançon, France .	+47 14 59.0	−11 38.5	310	9.999 229	− 5 32 12.95
25	Bethlehem, Pa. .	+40 36 23.1	−11 31.9	. . .	9.999 379	− 0 6 43.93
26	Birr Castle, Ireland	+53 5 47.0	−11 13.3	56	9.999 064	− 4 36 34.9
27	Bloomington, Ind.	+39 9 54	−11 25.5	266	9.999 433	+ 0 38 38
28	Bogota.	+ 4 36 15.4	−11 51.5	2634	0.000 170	− 0 11 21.58
29	Bombay, India .	+18 53 45	− 7 8.1	19	9.999 848	− 9 59 31.52
30	Bonn, Prussia . .	+50 43 45.0	−11 26.9	62	9.999 124	− 5 36 39.00
31	Bordeaux, France	+44 50 7.2	−11 40.4	73	9.999 276	− 5 6 10.24
32	Boston, Mass. . .	+42 20 58	−11 37.2	. . .	9.999 334	− 0 23 56.7
33	Bothkamp, Prussia	+54 12 9.6	−11 5.3	32	9.999 035	− 5 48 47.0
34	Bremen, Germany	+53 4 36	−11 13.4	. . .	9.999 061	− 5 43 31.7
35	Breslau, Prussia .	+51 6 55.8	−11 25.0	147	9.999 120	− 6 16 24.57
36	Brisbane	−27 28 0	+ 9 32.2	. . .	9.999 689	+ 8 39 37.8
37	Brussels, Belgium.	+50 47 55.5	−11 26.6	100	9.999 125	− 5 25 42.7
38	Budapest, Hungary	+47 29 34.7	−11 38.0	. . .	9.999 202	− 6 24 31.1
39	Cambridge, Eng. .	+52 12 51.6	−11 18.9	26	9.999 084	− 5 8 38.53
40	Cambridge, Mass. .	+42 22 47.6	−11 37.3	24	9.999 336	− 0 23 44.73
41	Cape of Good Hope	−33 56 3.6	+10 48.0	16	9.999 544	− 6 22 10.54
42	Carloforte . . .	+39 8 9	−11 25.3	18	9.999 417	− 5 41 30.7
43	Catania, Sicily . .	+37 30 13.3	−11 16.0	47	9.999 460	− 6 8 36
44	Charkow, Russia .	+50 0 9.6	−11 30.2	138	9.999 147	− 7 33 11.55
45	Charlottesville, Va.	+38 2 1.2	−11 19.3	250	9.999 461	+ 0 5 49.44

No.	Longitude from Greenwich.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	Description.
	In Time.	In Arc.		
	h m s	° ′ ″	s	
1	+ 0 7 0.1	+ 1 45 1.5	+ 1.15	Obs. Paris Academy of Science, Hendaye.
2	− 9 14 20.30	−138 35 4.5	− 91.06	South Australia.
3	+ 4 55 6.8	+ 73 46 42.0	+ 48.48	Dudley Obs. Old Obs. 36″.8 N., 6^s.79 E.
4	− 0 12 8.55	− 3 2 8.2	− 2.00	At Bouzaréah, near Algiers. Old Obs. 3′.8 S., 8^{s}E.
5	+ 5 20 5.39	+ 80 1 20.8	+ 52.58	Univ. of Pittsburgh. Old Obs., 76″.4 S., 2^s.46 E.
6	+ 4 50 5.93	+ 72 31 29.0	+ 47.66	Amherst College Obs. Old Obs. 20″.6 N., 1^s.26 E.
7	+ 5 34 55.19	+ 83 43 47.8	+ 55.02	Detroit Obs. of the University of Michigan.
8	+ 5 53 35.89	+ 88 23 58.4	+ 58.09	Underwood Obs. of the Lawrence University.
9	− 0 45 1.34	− 11 15 20.1	− 7.40	Near Florence, Italy.
10	+ 4 46 11.73	+ 71 32 56.0	+ 47.02	Branch of the Harvard College Observatory.
11	+ 0 26 35.4	+ 6 38 51.0	+ 4.37	University Observatory.
12	− 1 34 52.92	− 23 43 13.8	− 15.59	National Observatory of Greece.
13	+ 5 6 26.0	+ 76 36 30	+ 50.34	Johns Hopkins University Observatory.
14	− 0 43 33.65	− 10 53 24.8	− 7.16	Remeis Observatory.
15	− 0 8 28.0	− 2 7 0	− 1.39	Fabra Obs. of the Royal Acad. of Sci. and Arts.
16	− 7 43 38	−115 54 30	− 76.16	International Latitude Obs. West Australia.
17	+ 5 56 7.3	+ 89 1 49.5	+ 58.50	Smith Observatory of Beloit College.
18	− 0 21 12.75	− 5 18 11.2	− 3.48	Observatory of Naval School.
19	+ 8 9 2.72	+122 15 40.8	+ 80.34	Student's Obs. of the University of California.
20	− 0 53 34.85	− 13 23 42.8	− 8.80	Royal Obs. Old Obs. 56″.4 N., 0^s.39 W.
21	− 0 53 27.45	− 13 21 51.8	− 8.78	Urania Observatory.
22	− 0 53 54.2	− 13 28 33	− 8.86	Treptow Observatory.
23	− 0 29 45.73	− 7 26 26.0	− 4.89	Observatory of the Cantonal University.
24	− 0 23 57.17	− 5 59 17.6	− 3.94	National Observatory.
25	+ 5 1 31.85	+ 75 22 57.8	+ 49.53	Sayre Obs. of Lehigh Univ. at South Bethlehem.
26	+ 0 31 40.9	+ 7 55 13.5	+ 5.20	Private observatory of the Earl of Rosse.
27	+ 5 46 54	+ 86 43 30	+ 56.99	Kirkwood Obs. of the University of Indiana.
28	+ 4 56 54.20	+ 74 13 33.0	+ 48.77	National Obs. of the Republic of Colombia.
29	− 4 51 15.74	− 72 48 56.1	− 47.85	Government Obs. Colaba.
30	− 0 28 23.22	− 7 5 48.3	− 4.66	Royal University Observatory.
31	+ 0 2 5.54	+ 0 31 23.1	+ 0.34	Observatory, Univ. of Bordeaux at Floirac.
32	+ 4 44 19.1	+ 71 4 46.5	+ 46.71	Obs. of Boston Univ. Old Obs. 34″ N., 4^s.1 E.
33	− 0 40 31.2	− 10 7 48.0	− 6.66	Observatory of Herr. von Bülow.
34	− 0 35 15.9	− 8 48 58.5	− 5.79	Formerly Olber's Observatory.
35	− 1 8 8.79	− 17 2 11.8	− 11.20	Royal University Observatory.
36	−10 12 6.4	−153 1 36	−100.55	Queensland, Australia.
37	− 0 17 26.9	− 4 21 43.5	− 2.87	Royal Obs. of Belgium. Old Obs. 3′18″N., 1^s.8 E.
38	− 1 16 15.3	− 19 3 49.5	− 12.53	Geodetic Obs. of Royal Polytechnic School.
39	− 0 0 22.75	− 0 5 41.2	− 0.06	University of Cambridge Observatory.
40	+ 4 44 31.05	+ 71 7 45.8	+ 46.74	Harvard College Observatory.
41	− 1 13 54.76	− 18 28 41.4	− 12.14	Royal Observatory.
42	− 0 33 14.9	− 8 18 43.5	− 5.46	Internat. Lat. Obs., Sardinia.
43	− 1 0 20	− 15 5 0	− 9.91	Royal Astrophysical Obs. of the University.
44	− 2 24 55.77	− 36 13 56.6	− 23.81	University Observatory.
45	+ 5 14 5.22	+ 78 31 18.3	+ 51.60	Leander McCormick Obs. of Univ. of Virginia.

No.	Place.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (*Meters*).	Log ρ (*Including altitude*).	Longitude from Washington.
		° ′ ″	′ ″			h m s
46	Chicago, Ill. . . .	+41 50 1.0	−11 35.9	. . .	9.999 348	+ 0 42 11.06
47	Christiania, Norway	+59 54 44.0	−10 8.7	25	9.998 901	− 5 51 9.30
48	Cincinnati, Ohio .	+39 8 19.5	−11 25.4	249	9.999 433	+ 0 29 25.62
49	Cleveland, Ohio .	+41 30 14.5	−11 34.9	212	9.999 370	+ 0 18 10.04
50	Clinton, N. Y. . .	+43 3 17.0	−11 38.7	276	9.999 335	− 0 6 38.33
51	Coimbra, Portugal	+40 12 24.5	−11 30.3	99	9.999 396	− 4 34 32.7
52	Columbia, Mo. . .	+38 56 51.7	−11 24.4	225	9.999 436	+ 1 1 2.55
53	Columbus, Ohio .	+39 59 50.4	−11 29.4	. . .	9.999 394	+ 0 23 46.8
54	Copenhagen . . .	+55 41 12.6	−10 53.1	14	9.998 998	− 5 58 34.48
55	Cordoba	−31 25 15.2	+10 22.2	434	9.999 632	− 0 51 27.56
56	Cracow, Austria .	+50 3 52.0	−11 29.9	220	9.999 152	− 6 28 6.06
57	Dantzig	+54 21 18.0	−11 4.1	3	9.999 029	− 6 22 55.4
58	Dehra Dun, India.	+30 18 51.8	−10 9.4	687	9.999 674	−10 20 29.25
59	Denver, Colo. . .	+39 40 36.4	−11 27.9	1650	9.999 514	+ 1 51 31.85
60	Des Moines, Iowa .	+41 36 0	−11 35.2	296	9.999 374	+ 1 6 14.78
61	Dorpat, Russia .	+58 22 47.1	−10 26.4	65	9.998 938	− 6 55 9.07
62	Dresden, Saxony .	+51 2 16.8	−11 25.4	. . .	9.999 112	− 6 3 10.63
63	Dublin, Ireland .	+53 23 13.1	−11 11.3	86	9.999 059	− 4 42 54.7
64	Dun Echt., Scotland	+57 9 36	−10 39.2	141	9.998 972	− 4 58 35.8
65	Durham, England	+54 46 6.2	−11 0.9	107	9.999 026	− 5 1 56.03
66	Düsseldorf, Prussia	+51 12 25.0	−11 24.6	26	9.999 110	− 5 35 20.8
67	Edinburgh, Scotland	+55 55 28.0	−10 50.9	134	9.999 000	− 4 55 31.6
68	Edinburgh, Scotland	+55 57 23.2	−10 50.7	106	9.998 998	− 4 55 32.7
69	Evanston, Ill. . .	+42 3 33.4	−11 36.5	175	9.999 354	+ 0 42 26.5
70	Flagstaff, Ariz. .	+35 12 30.4	−10 59.2	2210	9.999 664	+ 2 18 28.79
71	Gaithersburg, Md.	+39 8 13.2	−11 25.4	165	9.999 427	+ 0 0 31.95
72	Geneva, N. Y. . .	+42 52 46.2	−11 38.3	152	9.999 331	− 0 0 14.78
73	Geneva, Switzerland	+46 11 58.8	−11 39.9	406	9.999 264	− 5 32 52.49
74	Genoa, Italy . .	+44 25 9.3	−11 40.2	105	9.999 288	− 5 43 57.11
75	Georgetown, D. C.	+38 54 26.7	−11 24.2	46	9.999 425	+ 0 0 2.48
76	Glasgow, Mo. . .	+39 13 45.6	−11 25.8	227	9.999 430	+ 1 3 2.30
77	Glasgow, Scotland.	+55 52 42.8	−10 51.5	55	9.998 997	− 4 51 5.23
78	Gotha, Germany .	+50 56 37.9	−11 25.9	320	9.999 136	− 5 51 6.27
79	Göttingen, Prussia	+51 31 47.9	−11 22.8	160	9.999 111	− 5 48 2.07
80	Greencastle, Ind. .	+39 38 46.6	−11 27.8	262	9.999 421	+ 0 39 8.56
81	Greenwich, England	+51 28 38.1	−11 23.1	47	9.999 104	− 5 8 15.78
82	Hamburg, Germany	+53 28 46.0	−11 10.6	40	9.999 054	− 5 49 14.3
83	Hamburg, Germany	+53 33 7.0	−11 10.1	25	9.999 051	− 5 48 9.6
84	Hamburg, Germany	+53 32 51.8	−11 10.2	30	9.999 051	− 5 48 9.20
85	Hanover, N. H. .	+43 42 15.3	−11 39.6	183	9.999 312	− 0 19 7.87
86	Haverford, Pa. . .	+40 0 40.1	−11 29.4	. . .	9.999 394	− 0 7 3.08
87	Heidelberg, Baden	+49 23 55.2	−11 32.6	570	9.999 192	− 5 43 8.91
88	Heidelberg, Baden	+49 23 54.9	−11 32.6	562	9.999 191	− 5 43 10.03
89	Helsingfors, Finland	+60 9 42.6	−10 5.6	38	9.998 896	− 6 48 4.93
90	Herény, Hungary .	+47 15 47.4	−11 38.4	229	9.999 224	− 6 14 40.5

No.	LONGITUDE FROM GREENWICH.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	DESCRIPTION.
	In Time.	In Arc.		
	h m s	° ′ ″	s	
46	+5 50 26.84	+ 87 36 42.6	+57.57	Old Obs.; transferred to Evanston, Ill., in 1887.
47	−0 42 53.52	− 10 43 22.8	− 7.05	Observatory of the University.
48	+5 37 41.40	+ 84 25 21.0	+55.48	Univ.Obs.on Mt.Lookout.OldObs.1′53″S.17^{s}.6W.
49	+5 26 25.82	+ 81 36 27.3	+53.62	Obs. of Case School of Applied Science.
50	+5 1 37.45	+ 75 24 21.7	+49.55	Litchfield Obs. of Hamilton College.
51	+0 33 43.1	+ 8 25 46.5	+ 5.54	Royal Astronomical Observatory of Portugal.
52	+6 9 18.33	+ 92 19 35.0	+60.67	Laws Observatory of the University of Missouri.
53	+5 32 2.6	+ 83 0 39.0	+54.55	Emerson McMillan Obs. of Ohio State Univ.
54	−0 50 18.70	− 12 34 40.5	− 8.26	University Observatory, Denmark.
55	+4 16 48.22	+ 64 12 3.3	+42.19	National Observatory of Argentine Republic.
56	−1 19 50.28	− 19 57 34.2	−13.12	Royal University Observatory.
57	−1 14 39.6	− 18 39 54.0	−12.26	Western Prussia.
58	−5 12 13.47	− 78 3 22.0	−51.29	Obs. Great Trigonometric Survey of India.
59	+6 59 47.63	+104 56 54.4	+68.96	Chamberlin Observatory of the Univ. of Denver.
60	+6 14 30.56	+ 93 37 38.4	+61.52	Drake University Observatory.
61	−1 46 53.29	− 26 43 19.3	−17.56	Observatory Imperial University (Jurjew).
62	−0 54 54.85	− 13 43 42.7	− 9.02	Baron Engelhardt's Observatory.
63	+0 25 21.1	+ 6 20 16.5	+ 4.16	Observatory of Trinity College at Dunsink.
64	+0 9 40.0	+ 2 25 0.0	+ 1.59	Formerly Lord Crawford's Observatory.
65	+0 6 19.75	+ 1 34 56.3	+ 1.04	Observatory of the University.
66	−0 27 5.0	− 6 46 15.0	− 4.45	Municipal Observatory, Bilk.
67	+0 12 44.2	+ 3 11 3.0	+ 2.09	Royal Obs. of Scotland, Blackford Hill.
68	+0 12 43.1	+ 3 10 46.5	+ 2.09	City Observatory, Calton Hill.
69	+5 50 42.3	+ 87 40 34.5	+57.61	Dearborn Observatory of North Western Univ.
70	+7 26 44.57	+111 41 8.6	+73.39	Lowell Observatory.
71	+5 8 47.73	+ 77 11 56.0	+50.73	International Latitude Observatory.
72	+5 8 1.00	+ 77 0 15.0	+50.60	Smith Observatory.
73	−0 24 36.71	− 6 9 10.7	− 4.04	Municipal Observatory.
74	−0 35 41.33	− 8 55 20.0	− 5.86	Hydrographic Institute.
75	+5 8 18.26	+ 77 4 33.9	+50.65	Georgetown College Observatory, Washington.
76	+6 11 18.08	+ 92 49 31.2	+61.00	Morrison Observatory.
77	+0 17 10.55	+ 4 17 38.3	+ 2.82	University Observatory.
78	−0 42 50.49	− 10 42 37.3	− 7.04	Ducal Observatory, Saxe-Coburg-Gotha.
79	−0 39 46.29	− 9 56 34.3	− 6.53	Royal University Observatory.
80	+5 47 24.34	+ 86 51 5.1	+57.07	McKim Observatory of De Pauw University.
81	0 0 0.00	0 0 0.0	0.00	Royal Observatory.
82	−0 40 58.5	− 10 14 37.5	− 6.73	New Observatory, Bergedorf.
83	−0 39 53.8	− 9 58 27.0	− 6.55	Old Observatory.
84	−0 39 53.42	− 9 58 21.3	− 6.55	Imperial Marine Observatory.
85	+4 49 7.91	+ 72 16 58.7	+47.50	Shattuck Observatory of Dartmouth College.
86	+5 1 12.70	+ 75 18 10.5	+49.48	Haverford College Observatory.
87	−0 34 53.13	− 8 43 17.0	− 5.73	Astronomical Institute, Königstuhl.
88	−0 34 54.25	− 8 43 33.7	− 5.73	Astrophysical Institute, Königstuhl.
89	−1 39 49.15	− 24 57 17.3	−16.40	University Observatory.
90	−1 6 24.7	− 16 36 10.5	−10.91	Astrophysical Obs., near Steinamanger.

No.	Place.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (*Meters*).	Log ρ (*Including altitude*).	Longitude from Washington.
		° ′ ″	′ ″			h m s
91	Hong Kong, China	+22 18 13.4	− 8 10.7	34	9.999 791	+11 15 2.36
92	Iowa City, Iowa .	+41 40 0	−11 35.4	183	9.999 364	+ 0 57 50
93	Ithaca, N. Y. . .	+42 26 47.3	−11 37.4	256	9.999 349	− 0 2 19.79
94	Jamaica, West Indies	+18 24 51	− 6 58.7	. . .	9.999 854	+ 0 3 13.70
95	Jena, Saxe-Weimar	+50 55 34.9	−11 26.0	156	9.999 126	− 5 54 36.05
96	Jena, Saxe-Weimer	+50 56 11.0	−11 25.9	174	9.999 126	− 5 54 36.56
97	Johannesburg . .	−26 10 54.5	+ 9 13.5	1806	9.999 838	− 7 0 33.8
98	Kalocsa	+46 31 41.7	−11 39.6	117	9.999 235	− 6 24 10.12
99	Kasan, Russia . .	+55 50 20.0	−10 51.7	98	9.999 000	− 8 23 32.3
100	Kasan, Russia . .	+55 47 24.3	−10 52.2	79	9.999 000	− 8 24 44.82
101	Kew, Eng. . . .	+51 28 6	−11 23.2	11	9.999 102	− 5 7 0.7
102	Kief, Russia . .	+50 27 10.5	−11 28.2	182	9.999 139	− 7 10 16.42
103	Kiel, Prussia . .	+54 20 27.6	−11 4.3	48	9.999 033	− 5 48 51.33
104	Kis-Kartal . . .	+47 41 54.8	−11 37.5	. . .	9.999 197	− 6 26 27.5
105	Königsberg, Prussia	+54 42 50.4	−11 1.3	22	9.999 022	− 6 30 14.82
106	Kremsmünster . .	+48 3 23.1	−11 36.7	384	9.999 214	− 6 4 47.37
107	La Plata	−34 54 30.3	+10 56.7	12	9.999 521	− 1 16 38.8
108	Lawrence, Kansas .	+36 57 30	−11 12.4	311	9.999 491	+ 1 12 42
109	Leiden, Netherlands	+52 9 20.0	−11 19.3	4	9.999 084	− 5 26 11.95
110	Leipzig, Saxony .	+51 20 5.9	−11 23.9	119	9.999 112	− 5 57 49.76
111	Liège, Belgium . .	+50 37 7	−11 27.5	127	9.999 132	− 5 30 31.0
112	Lisbon, Portugal .	+38 42 31.3	−11 23.1	94	9.999 433	− 4 31 31.10
113	Liverpool, Eng. .	+53 24 4.8	−11 11.2	62	9.999 057	− 4 55 58.45
114	Lund, Sweden . .	+55 41 51.6	−10 53.0	38	9.999 000	− 6 1 0.79
115	Lussinpiccolo . .	+44 32 11.0	−11 40.3	42	9.999 281	− 6 6 8.19
116	Lyons, France . .	+45 41 41.0	−11 40.3	300	9.999 268	− 5 27 24.33
117	Madison, Wis. . .	+43 4 36.8	−11 38.7	292	9.999 336	+ 0 49 22.15
118	Madras, India . .	+13 4 8.0	− 5 7.6	7	9.999 925	−10 29 14.90
119	Madrid, Spain . .	+40 24 29.7	−11 31.1	655	9.999 428	− 4 53 30.66
120	Manila, P. I. . .	+14 35 25	− 5 40.5	3	9.999 907	+10 47 54
121	Mare Island, Cal. .	+38 5 55.8	−11 19.7	22	9.999 444	+ 3 0 49.8
122	Markree, Ireland .	+54 10 31.8	−11 5.5	45	9.999 037	− 4 34 27.4
123	Marseilles, France .	+43 18 17.5	−11 39.1	75	9.999 315	− 5 29 50.37
124	Mauritius . . .	−20 5 39	+ 7 30.8	55	9.999 832	− 8 58 28.4
125	Melbourne, Victoria	−37 49 53.4	+11 18.1	28	9.999 451	+ 9 11 50.2
126	Meudon, France .	+48 48 18	−11 34.6	162	9.999 180	− 5 17 11.4
127	Middletown, Conn.	+41 33 16.0	−11 35.1	. . .	9.999 355	− 0 17 38.60
128	Milan, Italy . . .	+45 27 59.3	−11 40.4	120	9.999 262	− 5 45 1.70
129	Minneapolis, Minn.	+44 58 40.0	−11 40.4	260	9.999 285	+ 1 4 41.06
130	Mizusawa, Japan .	+39 8 3.6	−11 25.4	62	9.999 420	+ 9 27 13.47
131	Modena, Italy . .	+44 38 52.8	−11 40.4	. . .	9.999 275	− 5 51 58.7
132	Montreal, Canada .	+45 30 17.0	−11 40.4	67	9.999 258	− 0 13 57.15
133	Moscow, Russia .	+55 45 19.8	−10 52.5	150	9.999 005	− 7 38 32.87
134	Mount Hamilton .	+37 20 25.6	−11 14.9	1283	9.999 548	+ 2 58 19.11
135	Mount Wilson . .	+34 12 59.5	−10 50.6	1800	9.999 660	+ 2 43 58.55

No.	Longitude from Greenwich.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	Description.
	In Time.	In Arc.		
	h m s	° ′ ″	s	
91	−7 36 41.86	−114 10 27.9	−75.01	British Colonial Observatory.
92	+6 6 6	+ 91 31 30	+60.14	Obs. of the State Univ. of Iowa.
93	+5 5 55.99	+ 76 28 59.9	+50.26	Observatory of Cornell University.
94	+5 11 29.48	+ 77 52 22.2	+51.17	Mr. Hall's Observatory, Montego Bay.
95	−0 46 20.27	− 11 35 4.0	− 7.61	University Observatory.
96	−0 46 20.78	− 11 35 11.7	− 7.61	The late Dr. Winkler's Observatory.
97	−1 52 18.0	− 28 4 30.0	−18.45	Government Observatory, Transvaal.
98	−1 15 54.34	− 18 58 35.1	−12.47	Haynald Obs., Hungary.
99	−3 15 16.5	− 48 49 7.5	−32.08	Englehardt Observatory.
100	−3 16 29.04	− 49 7 15.6	−32.28	Imperial Univ. Observatory.
101	+0 1 15.1	+ 0 18 46.5	+ 0.21	Meteorological Obs., Kew Gardens, London.
102	−2 2 0.64	− 30 30 9.6	−20.04	Imperial University Observatory.
103	−0 40 35.55	− 10 8 53.3	− 6.67	Old position of Transit Circle, 0″.9 N., 0^{s}.12 E.
104	−1 18 11.7	− 19 32 55.5	−12.85	Near Aszód, Hungary.
105	−1 21 59.04	− 20 29 45.6	−13.47	Royal University Observatory.
106	−0 56 31.59	− 14 7 53.9	− 9.29	Obs. of the Benedictines, Austria.
107	+3 51 37.0	+ 57 54 15.0	+38.05	Obs. National Univ., Argentine Republic.
108	+6 20 58	+ 95 14 30	+62.58	Obs. of the State Univ. of Kansas.
109	−0 17 56.17	− 4 29 2.6	− 2.95	University Observatory.
110	−0 49 33.98	− 12 23 29.7	− 8.14	University Observatory.
111	−0 22 15.2	− 5 33 48.0	− 3.66	University Observatory, Cointe.
112	+0 36 44.68	+ 9 11 10.2	+ 6.04	Royal Astronomical Obs., Tapada.
113	+0 12 17.33	+ 3 4 20.0	+ 2.02	Bidston, Birkenhead.
114	−0 52 45.01	− 13 11 15.1	− 8.67	Royal Observatory of the University.
115	−0 57 52.41	− 14 28 6.1	− 9.51	Manora Observatory, Austria.
116	−0 19 8.55	− 4 47 8.3	− 3.14	Obs. of the Univ., St. Genis, Laval.
117	+5 57 37.93	+ 89 24 29.0	+58.75	Washburn Obs. of Univ. of Wisconsin.
118	−5 20 59.12	− 80 14 46.8	−52.73	Founded by East India Company.
119	+0 14 45.12	+ 3 41 16.8	+ 2.42	Ast. and Meteorological Observatory.
120	−8 3 50	−120 57 30	−79.48	Meteorological Observatory.
121	+8 9 5.6	+122 16 24.0	+80.35	U. S. Naval Observatory.
122	+0 33 48.4	+ 8 27 6.0	+ 5.55	Obs. of Col. Cooper, near Collooney.
123	−0 21 34.59	− 5 23 38.9	− 3.54	National Obs., Univ. of Aix-Marseilles.
124	−3 50 12.6	− 57 33 9.0	−37.82	Royal Alfred Observatory, Port-Louis.
125	−9 39 54.0	−144 58 30.0	−95.26	State Obs.; transf. from Williamstown in 1861.
126	−0 8 55.6	− 2 13 54.0	− 1.47	Seine-et-Oise, near Paris.
127	+4 50 37.18	+ 72 39 17.7	+47.74	Wesleyan University Observatory.
128	−0 36 45.92	− 9 11 28.8	− 6.04	Royal Observatory, Brera.
129	+6 12 56.84	+ 93 14 12.6	+61.27	Obs. of the State University of Minnesota.
130	−9 24 30.75	−141 7 41.3	−92.74	International Latitude Observatory.
131	−0 43 42.9	− 10 55 43.5	− 7.18	Ducal Observatory.
132	+4 54 18.63	+ 73 34 39.4	+48.35	McGill University Observatory.
133	−2 30 17.09	− 37 34 16.3	−24.69	Obs. of the Imperial University, Presnia.
134	+8 6 34.89	+121 38 43.3	+79.93	Lick Obs. of the University of California.
135	+7 52 14.33	+118 3 34.9	+77.58	Solar Observatory, near Pasadena, Cal.

No.	Place.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (*Meters*).	Log ρ (*Including altitude*).	Longitude from Washington.
		° ′ ″	′ ″			h m s
136	Munich, Bavaria .	+48 8 45.5	−11 36.5	528	9.999 222	− 5 54 41.85
137	Naples, Italy . .	+40 51 46.3	−11 32.8	154	9.999 382	− 6 5 17.51
138	Nashville, Tenn. .	+36 8 54.4	−11 6.6	. . .	9.999 490	+ 0 38 56.4
139	Natal, S. Africa .	−29 50 46.6	+10 3.7	79	9.999 642	− 7 12 16.96
140	Neuchâtel . . .	+47 0 1.2	−11 38.9	488	9.999 248	− 5 36 5.71
141	New Brunswick, N. J.	+40 30 0.6	−11 31.5	21	9.999 384	− 0 10 29.4
142	New Haven, Conn.	+41 19 22.3	−11 34.4	40	9.999 364	− 0 16 35.20
143	New York, N. Y. .	+40 48 34.6	−11 32.6	. . .	9.999 374	− 0 12 26
144	Nice, France . .	+43 43 16.9	−11 39.6	376	9.999 325	− 5 37 27.96
145	Nikolaieff, Russia .	+46 58 21.8	−11 38.9	55	9.999 220	− 7 16 9.58
146	Northampton, Mass.	+42 19 2	−11 37.2	81	9.999 340	− 0 17 42.7
147	Northfield, Minn. .	+44 27 41.6	−11 40.3	320	9.999 302	+ 1 4 20.03
148	Oakland, Cal. . .	+37 48 5	−11 17.9	11	9.999 450	+ 3 0 50.77
149	Odessa, Russia . .	+46 28 37.9	−11 39.6	. . .	9.999 228	− 7 11 18.0
150	Odessa, Russia . .	+46 28 36.7	−11 39.6	55	9.999 232	− 7 11 17.88
151	O-Gyalla, Hungary	+47 52 27.3	−11 37.1	113	9.999 200	− 6 21 1.32
152	Omaha, Nebr. . .	+41 16 5.6	−11 34.3	344	9.999 384	+ 1 15 31.18
153	Oncativo, Arg. Rep.	−31 55 10	+10 27.8	280	9.999 610	− 0 53 31.0
154	Orono, Maine . .	+44 53 58	−11 40.4	41	9.999 272	− 0 33 35.5
155	Ottawa, Canada .	+45 23 30	−11 40.4	85	9.999 262	− 0 5 22
156	Oxford, Miss. . .	+34 22 12.6	−10 52.0	. . .	9.999 533	+ 0 49 51.3
157	Oxford, Eng. . .	+51 45 35.4	−11 21.6	65	9.999 098	− 5 3 13.2
158	Oxford, Eng. . .	+51 45 34.2	−11 21.6	64	9.999 098	− 5 3 15.4
159	Padua, Italy . .	+45 24 5	−11 40.4	30	9.999 258	− 5 55 44.97
160	Palermo, Sicily . .	+38 6 44.0	−11 19.7	72	9.999 447	− 6 1 41.68
161	Paris, France . .	+48 50 11.2	−11 34.5	61	9.999 172	− 5 17 36.75
162	Perth	−31 57 8.9	+10 28.1	61	9.999 594	+11 8 22.48
163	Philadelphia, Pa. .	+39 58 2.1	−11 29.2	74	9.999 400	− 0 7 9.2
164	Pola, Austria . .	+44 51 48.7	−11 40.4	30	9.999 272	− 6 3 38.67
165	Potsdam, Prussia .	+52 22 56.0	−11 17.9	97	9.999 085	− 6 0 31.7
166	Poughkeepsie, N. Y.	+41 41 18	−11 35.5	46	9.999 354	− 0 12 42.13
167	Prague, Bohemia .	+50 5 15.8	−11 29.8	197	9.999 149	− 6 5 56.1
168	Princeton, N. J. .	+40 20 55.8	−11 30.9	50	9.999 389	− 0 9 36.34
169	Providence, R. I. .	+41 50 21	−11 35.9	64	9.999 352	− 0 22 39.83
170	Providence, R. I. .	+41 49 46.4	−11 35.9	. . .	9.999 348	− 0 22 38.14
171	Pulkowa, Russia .	+59 46 18.7	−10 10.4	74	9.998 907	− 7 9 34.42
172	Quebec, Canada .	+46 47 59.2	−11 39.2	90	9.999 226	− 0 23 23.14
173	Quito	− 0 14 0	+ 0 5.7	2908	0.000 198	+ 0 5 50.88
174	Riga, Russia . .	+56 57 9.3	−10 41.3	. . .	9.998 967	− 6 44 43.95
175	Rio de Janeiro . .	−22 54 23.6	+ 8 21.1	61	9.999 783	− 2 15 34.4
176	Rome, Italy . .	+41 53 53.6	−11 36.1	51	9.999 350	− 5 58 11.33
177	Rome, Italy. . .	+41 53 33.5	−11 36.0	65	9.999 350	− 5 58 12.15
178	Rome, Italy. . .	+41 54 4.8	−11 36.1	100	9.999 353	− 5 58 5.25
179	San Fernando . .	+36 27 42.0	−11 8.9	30	9.999 485	− 4 43 26.6
180	San Francisco, Cal.	+37 47 27.9	−11 17.8	. . .	9.999 450	+ 3 1 27.08

No.	Longitude from Greenwich.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	Description.
	In Time.	In Arc.		
	h m s	° ′ ″	s	
136	−0 46 26.07	− 11 36 31.0	− 7.63	Royal Observatory.
137	−0 57 1.73	− 14 15 26.0	− 9.37	Royal Obs., Capo di Monte.
138	+5 47 12.2	+ 86 48 3.0	+57.04	Observatory of Vanderbilt University.
139	−2 4 1.18	− 31 0 17.7	−20.37	Government Observatory, Durban.
140	−0 27 49.93	− 6 57 29.0	− 4.57	Cantonal Observatory, Switzerland.
141	+4 57 46.4	+ 74 26 36	+48.92	Schank Obs., Rutgers College.
142	+4 51 40.58	+ 72 55 8.7	+47.92	Yale University Obs. Old Obs. 45″.8 S., 1^{s}.58 W.
143	+4 55 50	+ 73 57 30	+48.60	Columbia Univ. Obs. Old Obs. 3′ 11″.5 S., 3^{s}.6 E.
144	−0 29 12.18	− 7 18 2.7	− 4.80	Mt. Gros, near Nice.
145	−2 7 53.80	− 31 58 27.0	−21.01	Naval Observatory.
146	+4 50 33.1	+ 72 38 16.5	+47.73	Smith College Observatory.
147	+6 12 35.81	+ 93 8 57.1	+61.21	Goodsell Observatory of Carleton College.
148	+8 9 6.55	+122 16 38.3	+80.35	Chabot University.
149	−2 3 2.18	− 30 45 32.7	−20.21	Branch of Pulkowa Observatory.
150	−2 3 2.10	− 30 45 31.5	−20.21	University Observatory.
151	−1 12 45.54	− 18 11 23.1	−11.95	Royal Astrophysical Observatory.
152	+6 23 46.96	+ 95 56 44.4	+63.05	Creighton University Observatory.
153	+4 14 44.8	+ 63 41 12.0	+41.85	International Latitude Observatory.
154	+4 34 40.3	+ 68 40 4.5	+45.12	Observatory of the University of Maine.
155	+5 2 54	+ 75 43 30	+49.76	Dominion Observatory.
156	+5 58 7.1	+ 89 31 46.5	+58.83	Observatory of the University of Mississippi.
157	+0 5 2.6	+ 1 15 39.0	+ 0.83	Radcliffe Observatory.
158	+0 5 0.4	+ 1 15 6.0	+ 0.82	University Observatory.
159	−0 47 29.19	− 11 52 17.9	− 7.80	Royal University Observatory.
160	−0 53 25.90	− 13 21 28.5	− 8.78	Royal Observatory.
161	−0 9 20.97	− 2 20 14.6	− 1.53	National Observatory of Paris.
162	−7 43 21.74	−115 50 26.1	−76.12	State Observatory, West Australia.
163	+5 1 6.6	+ 75 16 39.0	+49.46	Flower Observatory, University of Pennsylvania.
164	−0 55 22.89	− 13 50 43.3	− 9.10	Obs. of the Imperial Hydrographic Office.
165	−0 52 15.9	− 13 3 58.5	− 8.59	Royal Astrophysical Observatory.
166	+4 55 33.65	+ 73 53 24.7	+48.55	Vassar College Observatory.
167	−0 57 40.3	− 14 25 4.5	− 9.47	Royal Observatory of the University.
168	+4 58 39.44	+ 74 39 51.6	+49.06	Halsted Observatory of Princeton University.
169	+4 45 35.95	+ 71 23 59.3	+46.92	Ladd Observatory of Brown University.
170	+4 45 37.64	+ 71 24 24.6	+46.92	Mr. Seagrave's Observatory.
171	−2 1 18.64	− 30 19 39.6	−19.93	Obs. Central Nicolas, near St. Petersburg.
172	+4 44 52.64	+ 71 13 9.6	+46.80	Bonner's Hill.
173	+5 14 6.66	+ 78 31 39.9	+51.60	National Observatory of Ecuador.
174	−1 36 28.17	− 24 7 2.6	−15.85	Polytechnic School Observatory.
175	+2 52 41.4	+ 43 10 21.0	+28.37	National Observatory of Brazil.
176	−0 49 55.55	− 12 28 53.3	− 8.20	Royal Observatory at Roman College.
177	−0 49 56.37	− 12 29 5.6	− 8.20	Royal University Observatory at Capitol.
178	−0 49 49.47	− 12 27 22.0	− 8.18	Vatican Observatory.
179	+0 24 49.2	+ 6 27 18.0	+ 4.08	Naval Observatory, near Cadiz, Spain.
180	+8 9 42.86	+122 25 42.9	+80.45	Davidson Observatory.

No.	Place.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (*Meters*).	Log ρ (*Including altitude*).	Longitude from Washington.
		° ′ ″	′ ″			h m s
181	San Luis, Arg. Rep.	−33 18 0	+10 42.0	800	9.999 614	− 0 42 52
182	Santiago, Chile	−33 26 42.0	+10 43.4	519	9.999 590	− 0 25 29.56
183	South Hadley, Mass.	+42 15 18.2	−11 37.0	76	9.999 342	− 0 17 55.49
184	St. Louis, Mo.	+38 38 3.0	−11 22.7	. . .	9.999 429	+ 0 52 33.48
185	St. Petersburg	+59 56 32.0	−10 8.4	4	9.998 898	− 7 9 27.2
186	Stockholm, Sweden	+59 20 33.0	−10 15.5	44	9.998 915	− 6 20 29.77
187	Stonyhurst, Eng.	+53 50 40	−11 8.0	116	9.999 050	− 4 58 23.10
188	Strassburg, Alsace	+48 35 0.3	−11 35.3	144	9.999 184	− 5 39 20.47
189	Sydney, N. S. W.	−33 51 41.1	+10 47.3	44	9.999 548	+ 8 46 54.68
190	Syracuse, N. Y.	+43 2 13.1	−11 38.6	160	9.999 328	− 0 3 42.42
191	Tacubaya	+19 24 17.5	− 7 17.8	2280	9.999 994	+ 1 28 30.75
192	Tashkent	+41 19 31.3	−11 34.4	457	9.999 392	− 9 45 26.58
193	Taunton, Mass.	+41 54 0	−11 36.1	8	9.999 347	− 0 23 56
194	Teramo, Italy	+42 39 27	−11 37.9	398	9.999 354	− 6 3 12
195	Tokio, Japan	+35 39 17.5	−11 2.8	. . .	9.999 502	+ 9 32 46.20
196	Toronto, Canada	+43 39 35.9	−11 39.6	108	9.999 308	+ 0 9 18.87
197	Toulouse, France	+43 36 45	−11 39.5	194	9.999 315	− 5 14 5.66
198	Triest, Austria	+45 38 45.4	−11 40.3	67	9.999 255	− 6 3 18.73
199	Troy, N. Y.	+42 43 52.9	−11 38.1	. . .	9.999 325	− 0 13 33.49
200	Tschardjui	+39 8 10.7	−11 25.4	167	9.999 427	− 9 22 13.1
201	Tulse Hill	+51 26 47.0	−11 23.3	48	9.999 105	− 5 7 48.1
202	Turin, Italy	+45 4 8.0	−11 40.4	276	9.999 284	− 5 39 2.96
203	Tuscaloosa, Ala.	+33 12 36.8	−10 41.1	. . .	9.999 561	+ 0 41 55.96
204	Ukiah, Cal.	+39 8 12.1	−11 25.4	220	9.999 431	+ 3 3 53
205	Upsala, Sweden	+59 51 29.4	−10 9.3	21	9.998 901	− 6 18 45.93
206	Urbana, Ill.	+40 6 20.2	−11 29.8	236	9.999 408	+ 0 44 38.2
207	Utrecht, Netherlands	+52 5 9.6	−11 19.7	13	9.999 087	− 5 28 46.8
208	Venice, Italy	+45 26 10.5	−11 40.4	15	9.999 256	− 5 57 37.90
209	Vienna, Austria	+48 13 55.4	−11 36.2	240	9.999 199	− 6 13 37.17
210	Vienna, Austria	+48 12 53.8	−11 36.2	214	9.999 198	− 6 13 41.1
211	Vienna, Austria	+48 12 46.7	−11 36.2	280	9.999 202	− 6 13 26.89
212	Warsaw, Russia	+52 13 4.7	−11 18.9	110	9.999 090	− 6 32 23.06
213	Washington, D. C.	+38 55 14.0	−11 24.2	82	9.999 428	0 0 0.00
214	Washington, D. C.	+38 53 38.8	−11 24.1	31	9.999 424	− 0 0 3.63
215	Washington, D. C.	+38 53 17.3	−11 24.1	9	9.999 422	− 0 0 9.6
216	Washington, D. C.	+38 56 14.8	−11 24.2	. . .	9.999 422	− 0 0 15.78
217	Wellesley, Mass.	+42 17 43	−11 37.1	61	9.999 340	− 0 23 3
218	Wellington	−41 18 0.6	+11 34.3	47	9.999 364	+ 7 12 37.70
219	West Point, N. Y.	+41 23 22.1	−11 34.6	170	9.999 371	− 0 12 25.23
220	Wilhelmshaven	+53 31 52.2	−11 10.3	8	9.999 051	− 5 40 50.89
221	Williams Bay, Wis.	+42 34 12.6	−11 37.7	335	9.999 352	+ 0 45 57.46
222	Williamstown, Mass.	+42 42 30	−11 38.0	213	9.999 340	− 0 15 26
223	Windsor, N. S. W.	−33 36 30.8	+10 44.9	16	9.999 552	+ 8 48 23.7
224	Zô-Sè, China	+31 5 47.7	−10 18.6	100	9.999 617	+10 46 59.5
225	Zürich	+47 22 40.0	−11 38.2	470	9.999 237	− 5 42 28.08

No.	Longitude from Greenwich.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	Description.
	In Time.	In Arc.		
	h m s	° ′ ″	s	
181	+ 4 25 24	+ 66 21 0	+ 43.60	Southern Observatory of Carnegie Institution.
182	+ 4 42 46.22	+ 70 41 33.3	+ 46.45	National Obs. of Chile. Old Obs. 16″.6 N., 9^{s}.5 E.
183	+ 4 50 20.29	+ 72 35 4.3	+ 47.70	Observatory of Mt. Holyoke College.
184	+ 6 0 49.26	+ 90 12 18.9	+ 59.27	Washington University Observatory.
185	− 2 1 11.4	− 30 17 51.0	− 19.91	Imperial University Observatory, Russia.
186	− 1 12 13.99	− 18 3 29.9	− 11.87	Observatory of Academy of Science.
187	+ 0 9 52.68	+ 2 28 10.2	+ 1.62	Stonyhurst College Observatory, near Blackburn.
188	− 0 31 4.69	− 7 46 10.3	− 5.11	Imperial University Observatory.
189	−10 4 49.54	−151 12 23.1	− 99.36	Government Observatory.
190	+ 5 4 33.36	+ 76 8 20.4	+ 50.03	Observatory of Syracuse University.
191	+ 6 36 46.53	+ 99 11 38.0	+ 65.18	National Observatory of Mexico.
192	− 4 37 10.80	− 69 17 42.0	− 45.53	Turkestan, Russia.
193	+ 4 44 20	+ 71 5 0	+ 46.71	Mr. Metcalf's Observatory.
194	− 0 54 56	− 13 44 0	− 9.02	At Collurania, near Teramo.
195	− 9 18 58.02	−139 44 30.3	− 91.82	University Observatory.
196	+ 5 17 34.65	+ 79 23 39.7	+ 52.17	University Observatory.
197	− 0 5 49.88	− 1 27 28.2	− 0.96	University Observatory.
198	− 0 55 2.95	− 13 45 44.3	− 9.04	Imperial Maritime Observatory.
199	+ 4 54 42.29	+ 73 40 34.3	+ 48.41	Observatory Rensselaer Polytechnic Institute.
200	− 4 13 57.3	− 63 29 19.5	− 41.72	International Latitude Obs., Turkestan.
201	+ 0 0 27.7	+ 0 6 55.5	+ 0.08	Observatory of Sir W. Huggins, London.
202	− 0 30 47.18	− 7 41 47.7	− 5.06	Royal Observatory, Palazzo Madama.
203	+ 5 50 11.74	+ 87 32 56.1	+ 57.53	Observatory of the University of Alabama.
204	+ 8 12 9	+123 2 15	+ 80.85	International Latitude Observatory.
205	− 1 10 30.15	− 17 37 32.3	− 11.58	University Observatory.
206	+ 5 52 54.0	+ 88 13 30	+ 57.97	Observatory of the University of Illinois.
207	− 0 20 31.0	− 5 7 45.0	− 3.37	University Observatory, Sonnenborgh.
208	− 0 49 22.12	− 12 20 31.8	− 8.11	Observatory of the Nautical Institute.
209	− 1 5 21.39	− 16 20 20.9	− 10.74	Imperial Univ. Obs. Old Obs. 1′ 20″ S., 10^{s}.25 E.
210	− 1 5 25.3	− 16 21 19.5	− 10.75	Oppolzer Observatory, Josephstadt.
211	− 1 5 11.11	− 16 17 46.7	− 10.71	Kuffner Observatory, Ottakring.
212	− 1 24 7.28	− 21 1 49.2	− 13.82	Imperial University Observatory.
213	+ 5 8 15.78	+ 77 3 56.7	+ 50.64	U. S. Naval Observatory, Georgetown Heights.
214	+ 5 8 12.15	+ 77 3 2.3	+ 50.63	Old U. S. Naval Observatory. 1842–1893.
215	+ 5 8 6.2	+ 77 1 33.0	+ 50.61	Smithsonian Astrophysical Observatory.
216	+ 5 8 0.0	+ 77 0 0.0	+ 50.60	Catholic University Obs., Brookland, D. C.
217	+ 4 45 13	+ 71 18 15	+ 46.85	Whitin Observatory of Wellesley College.
218	−11 39 6.52	−174 46 37.8	−114.85	Colonial Time Service Obs. of New Zealand.
219	+ 4 55 50.55	+ 73 57 38.3	+ 48.60	U. S. Military Academy. Old Obs. 9″ N., 1^{s}.2 E.
220	− 0 32 35.11	− 8 8 46.7	− 5.35	Imperial Naval Observatory of Germany.
221	+ 5 54 13.24	+ 88 33 18.6	+ 58.19	Yerkes Observatory of University of Chicago.
222	+ 4 52 50	+ 73 12 30	+ 48.10	Field Memorial Observatory, Williams College.
223	−10 3 20.5	−150 50 7.5	− 99.11	Mr. John Tebbutt's Observatory.
224	− 8 4 44.7	−121 11 10.5	− 79.63	Obs. of the Jesuits near Shanghai.
225	− 0 34 12.30	− 8 33 4.5	− 5.62	Obs. of the Polytechnic School, Switzerland.

THE COMPUTATION OF LUNAR DISTANCES.

The tables of lunar distances formerly given on pages XIII to XVIII, inclusive, for each month of the Greenwich Ephemeris, are omitted, as it has been decided by the authorities of the Navy Department that they are now of little practical use to navigators. However, in case it is desired to use this method, the angular distance between the Moon and any heavenly body may be calculated by solving the spherical triangle of which the known parts are the polar distances of the Moon and the other body and the difference of their right ascensions, or, in other words, the angle at the pole between their hour-circles. Then, the Greenwich mean time of the observation being approximately known, and the lunar distances for the star or other body calculated for the even hour before and after, the required lunar distance may be interpolated and the longitude derived by the methods given in Bowditch and other books on navigation.

EXAMPLE 1.

Find the lunar distance of Aldebaran, May 11, 1913, at 8 P. M. Greenwich Mean Time.

Let α and δ = Right Ascension and Declination of the star
" α' and δ' = " " " " " " Moon
" D = Lunar Distance
Also let $\tan M = \tan \delta' \sec (\alpha - \alpha')$
Then $\cos D = \sin \delta' \cos (M - \delta) \operatorname{cosec} M$

$\alpha = 4^h\ 30^m\ 55^s.3$
$\alpha' = 8^h\ 8^m\ 7^s.1$
$\alpha - \alpha' = -3^h\ 37^m\ 11^s.8$
$\alpha - \alpha' = -54^\circ\ 17'\ 57''$
$\delta' = +24^\circ\ 52'\ 46''$
$\tan \delta' = 9.666283$
$\sec (\alpha - \alpha') = \underline{0.233920}$
$\tan M = 9.900203$

$M = +38^\circ\ 28'\ 27''$
$\delta = +16^\circ\ 20'\ 14''$
$M - \delta = +22^\circ\ 8'\ 13''$
$\sin \delta' = 9.623983$
$\cos (M - \delta) = 9.966745$
$\operatorname{cosec} M = \underline{0.206097}$
$\cos D = 9.796825$
$D = 51^\circ\ 13'\ 4''$

EXAMPLE 2.

Find the lunar distance of Venus, February 8, 1913, at 6 P. M. Greenwich Mean Time. In this case the distance is smaller and the following method is more accurate:

Let α and δ = Right Ascension and Declination of the planet
" α' and δ' = " " " " " " Moon
D = Lunar distance
Also let $\tan N = \tan \tfrac{1}{2} (\alpha - \alpha') \cos \tfrac{1}{2} (\delta + \delta') \operatorname{cosec} \tfrac{1}{2} (\delta - \delta')$
Then $\sin \tfrac{1}{2} D = \sin \tfrac{1}{2} (\alpha - \alpha') \cos \tfrac{1}{2} (\delta + \delta') \operatorname{cosec} N$

$\alpha = 0^h\ 20^m\ 47^s.8$
$\alpha' = 23^h\ 13^m\ 24^s.0$
$\alpha - \alpha' = 1^h\ 7^m\ 23^s.8$
$\alpha - \alpha' = +16^\circ\ 50'\ 57''$
$\delta = +3^\circ\ 17'\ 2''$
$\delta' = -6^\circ\ 39'\ 6''$
$\delta + \delta' = -3^\circ\ 22'\ 4''$
$\delta - \delta' = +9^\circ\ 56'\ 8''$

$\tfrac{1}{2}(\alpha - \alpha') = +8^\circ\ 25'\ 28''$
$\tfrac{1}{2}(\delta + \delta') = -1^\circ\ 41'\ 2''$
$\tfrac{1}{2}(\delta - \delta') = +4^\circ\ 58'\ 4''$

$\tan \tfrac{1}{2}(\alpha - \alpha') = 9.170564$
$\cos \tfrac{1}{2}(\delta + \delta') = 9.999812$
$\operatorname{cosec} \tfrac{1}{2}(\delta - \delta') = \underline{1.062505}$
$\tan N = 0.232881$
$N = 59^\circ\ 40'\ 28''$

$\sin \tfrac{1}{2}(\alpha - \alpha') = 9.165853$
$\cos \tfrac{1}{2}(\delta + \delta') = 9.999812$
$\operatorname{cosec} N = \underline{0.063903}$
$\sin \tfrac{1}{2} D = 9.229568$
$\tfrac{1}{2} D = 9^\circ\ 46'\ 4''$
$D = 19^\circ\ 32'\ 8''$

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1913

Reduce the observed altitude of Polaris to the true altitude.

Reduce the recorded time of observation to the local sidereal time.

Take out the App. R. A. and App. Decl. of Polaris for the time of observation (pp. 251–262).

Subtract the App. R. A. from the local sidereal time of observation and the remainder is the hour-angle of Polaris.

With this hour-angle as the vertical argument, and the App. Decl. of Polaris as the horizontal argument, take out the correction from Table I and add it to or subtract it from the true altitude, according to its sign.

For other altitudes than 45°, corrections taken from the supplementary table at the bottom of Table I (Table Ia) may be applied when necessary for the degree of accuracy required.

Example.—1913, October 7, at $10^h\ 40^m\ 30^s$ P. M. local mean solar time, in longitude 59° west of Greenwich, suppose the true altitude of Polaris to be 33° 20′ 0″, required the latitude of the place.

	h	m	s
Local astronomical mean time	10	40	30
Reductions from Table III for $10^h\ 40^m\ 30^s$		+1	45
Greenwich sidereal time of mean noon, October 7, page 111	13	2	6
Reduction from Table III, for longitude (=$3^h\ 56^m$ west, or plus)		+0	39
	h	m	s
Sum (having regard to signs) is equal to local sidereal time .	23	45	0
R. A. of Polaris (page 260) for time of observation . .	1	29	15
	h	m	s
Remainder is equal to hour-angle of Polaris . . .	22	15	45
Decl. of Polaris (page 260) for time of observation 88° 50′ 46″			
	°	′	″
True altitude	+33	20	0
Correction from Table I	− 1	2	4
Correction from Table Ia			− 3
	°	′	″
Latitude of the place	+32	17	53

Observations of Polaris for latitude should be made when practicable, near the times of upper or of lower culminations (hour-angle 0^h or 12^h). However, at sea, if made near elongation (hour-angle 6^h or 18^h), the hour-angle, and hence the local time, should be known within one minute.

Decl. / H. A.	88° 50′ 20″		88° 50′ 30″		88° 50′ 40″		88° 50′ 50″		88° 51′ 0″		88° 51′ 10″		Decl. / H. A.
h m	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		h m
0 0	−69 40	1	−69 30	1	−69 20	1	−69 10	1	−69 0	1	−68 50	1	24 0
3	69 39	1	69 29	1	69 19	1	69 9	1	68 59	1	68 49	1	23 57
6	69 38	2	69 28	2	69 18	2	69 8	2	68 58	2	68 48	2	54
9	69 36	2	69 26	2	69 16	2	69 6	2	68 56	2	68 46	2	51
12	69 34	3	69 24	3	69 14	3	69 4	3	68 54	3	68 44	3	48
0 15	−69 31	4	−69 21	4	−69 11	4	−69 1	4	−68 51	4	−68 41	4	23 45
18	69 27	5	69 17	5	69 7	5	68 57	5	68 47	5	68 37	5	42
21	69 22	6	69 12	6	69 2	6	68 52	6	68 42	6	68 32	5	39
24	69 16	6	69 6	6	68 56	6	68 46	6	68 36	6	68 27	6	36
27	69 10	7	69 0	7	68 50	7	68 40	7	68 30	7	68 21	7	33
0 30	−69 3	7	−68 53	7	−68 43	7	−68 33	7	−68 23	7	−68 14	8	23 30
33	68 56	8	68 46	8	68 36	8	68 26	8	68 16	8	68 6	8	27
36	68 48	9	68 38	9	68 28	9	68 18	9	68 8	9	67 58	9	24
39	68 39	10	68 29	10	68 19	10	68 9	10	67 59	10	67 49	10	21
42	68 29	11	68 19	11	68 9	11	67 59	11	67 49	11	67 39	10	18
0 45	−68 18	11	−68 8	11	−67 58	11	−67 48	11	−67 38	11	−67 29	11	23 15
48	68 7	12	67 57	12	67 47	12	67 37	12	67 27	12	67 18	12	12
51	67 55	13	67 45	13	67 35	13	67 25	13	67 15	13	67 6	13	9
54	67 42	13	67 32	13	67 22	13	67 12	13	67 2	13	66 53	13	6
0 57	67 29	14	67 19	14	67 9	14	66 59	14	66 49	14	66 40	14	3
1 0	−67 15	14	−67 5	14	−66 55	14	−66 45	14	−66 35	14	−66 26	14	23 0
3	67 1	15	66 51	15	66 41	15	66 31	15	66 21	15	66 12	15	22 57
6	66 46	17	66 36	17	66 26	17	66 16	17	66 6	16	65 57	16	54
9	66 29	17	66 19	17	66 9	17	65 59	17	65 50	17	65 41	17	51
1 12	−66 12		−66 2		−65 52		−65 42		−65 33		−65 24		22 48

TABLE I.

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1913.

Decl. H. A.	88° 50′ 20″		88° 50′ 30″		88° 50′ 40″		88° 50′ 50″		88° 51′ 0″		88° 51′ 10″		Decl. H. A.
h m	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		h m
1 12	−66 12	18	−66 2	18	−65 52	18	−65 42	17	−65 33	18	−65 24	18	22 48
15	65 54	18	65 44	18	65 34	18	65 25	18	65 15	18	65 6	18	45
18	65 36	19	65 26	19	65 16	19	65 7	19	64 57	18	64 48	18	42
21	65 17	20	65 7	19	64 57	19	64 48	19	64 39	20	64 30	20	39
24	64 57	20	64 48	20	64 38	20	64 29	20	64 19	20	64 10	20	36
1 27	−64 37	21	−64 28	21	−64 18	21	−64 9	21	−63 59	20	−63 50	20	22 33
30	64 16	22	64 7	22	63 57	22	63 48	22	63 39	22	63 30	22	30
33	63 54	22	63 45	22	63 35	22	63 26	22	63 17	22	63 8	22	27
36	63 32	23	63 23	23	63 13	23	63 4	23	62 55	23	62 46	23	24
39	63 9	24	63 0	24	62 50	23	62 41	23	62 32	23	62 23	23	21
1 42	−62 45	24	−62 36	24	−62 27	24	−62 18	24	−62 9	24	−62 0	24	22 18
45	62 21	25	62 12	25	62 3	25	61 54	25	61 45	25	61 36	24	15
48	61 56	26	61 47	26	61 38	26	61 29	25	61 20	25	61 12	26	12
51	61 30	26	61 21	26	61 12	26	61 4	26	60 55	26	60 46	26	9
54	61 4	27	60 55	27	60 46	27	60 38	27	60 29	27	60 20	26	6
1 57	−60 37	28	−60 28	28	−60 19	27	−60 11	27	−60 2	27	−59 54	27	22 3
2 0	60 9	28	60 0	28	59 52	28	59 44	28	59 35	28	59 27	28	22 0
3	59 41	29	59 32	29	59 24	29	59 16	29	59 7	29	58 59	29	21 57
6	59 12	29	59 3	29	58 55	29	58 47	29	58 38	29	58 30	29	54
9	58 43	30	58 34	30	58 26	30	58 18	30	58 9	29	58 1	29	51
2 12	−58 13	31	−58 4	30	−57 56	30	−57 48	30	−57 40	31	−57 32	31	21 48
15	57 42	31	57 34	31	57 26	31	57 18	31	57 9	31	57 1	31	45
18	57 11	32	57 3	32	56 55	32	56 47	32	56 38	31	56 30	31	42
21	56 39	32	56 31	32	56 23	32	56 15	32	56 7	32	55 59	32	39
24	56 7	33	55 59	33	55 51	33	55 43	33	55 35	33	55 27	33	36
2 27	−55 34	34	−55 26	34	−55 18	34	−55 10	33	−55 2	33	−54 54	33	21 33
30	55 0	34	54 52	34	54 44	34	54 37	34	54 29	34	54 21	33	30
33	54 26	35	54 18	35	54 10	35	54 3	35	53 55	35	53 48	35	27
36	53 51	35	53 43	35	53 35	35	53 28	35	53 20	34	53 13	34	24
39	53 16	36	53 8	36	53 0	36	52 53	36	52 46	36	52 39	36	21
2 42	−52 40	36	−52 32	36.	−52 24	36	−52 17	36	−52 10	36	−52 3	36	21 18
45	52 4	37	51 56	37	51 48	36	51 41	36	51 34	36	51 27	36	15
48	51 27	37	51 19	37	51 12	37	51 5	37	50 58	37	50 51	37	12
51	50 50	38	50 42	38	50 35	38	50 28	38	50 21	38	50 14	38	9
54	50 12	38	50 4	38	49 57	38	49 50	38	49 43	38	49 36	38	6
2 57	−49 34	39	−49 26	39	−49 19	38	−49 12	38	−49 5	38	−48 58	38	21 3
3 0	48 55	40	48 47	39	48 41	39	48 34	39	48 27	39	48 20	39	21 0
3	48 15	40	48 8	40	48 2	40	47 55	40	47 48	40	47 41	40	20 57
6	47 35	41	47 28	41	47 22	41	47 15	40	47 8	40	47 1	39	54
9	46 54	41	46 47	41	46 41	41	46 35	41	46 28	41	46 22	41	51
3 12	−46 13	41	−46 6	41	−46 0	41	−45 54	42	−45 47	41	−45 41	41	20 48
15	45 32	42	45 25	42	45 19	42	45 12	42	45 6	42	45 0	42	45
18	44 50	42	44 43	42	44 37	42	44 30	42	44 24	42	44 18	41	42
21	44 8	43	44 1	43	43 55	43	43 48	42	43 42	42	43 37	43	39
24	43 25	43	43 18	43	43 12	43	43 6	43	43 0	43	42 54	42	36
3 27	−42 42	44	−42 35	43	−42 29	43	−42 23	43	−42 17	43	−42 12	44	20 33
30	41 58	44	41 52	44	41 46	44	41 40	44	41 34	44	41 28	43	30
33	41 14	45	41 8	45	41 2	44	40 56	44	40 50	44	40 45	44	27
36	40 29	45	40 23	45	40 18	45	40 12	45	40 6	45	40 1	45	24
39	39 44	46	39 38	45	39 33	45	39 27	45	39 21	45	39 16	45	21
3 42	−38 58	46	−38 53	46	−38 48	46	−38 42	45	−38 36	45	−38 31	45	20 18
45	38 12	46	38 7	46	38 2	46	37 57	46	37 51	46	37 46	46	15
48	37 26	46	37 21	46	37 16	46	37 11	46	37 5	46	37 0	46	12
51	36 40	47	36 35	47	36 30	47	36 25	47	36 19	46	36 14	46	9
54	35 53	47	35 48	47	35 43	47	35 38	47	35 33	47	35 28	47	6
3 57	−35 6	48	−35 1	48	−34 56	47	−34 51	47	−34 46	47	−34 41	47	20 3
4 0	34 18	48	34 13	48	34 9	48	34 4	48	33 59	48	33 54	47	20 0
3	33 30	48	33 25	48	33 21	48	33 16	48	33 11	48	33 7	48	19 57
6	32 42	49	32 37	49	32 33	49	32 28	48	32 23	48	32 19	48	54
4 9	−31 53		−31 48		−31 44		−31 40		−31 35		−31 31		19 51

TABLE I.

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1913.

H. A. \ Decl.	88° 50′ 20″		88° 50′ 30″		88° 50′ 40″		88° 50′ 50″		88° 51′ 0″		88° 51′ 10″		Decl. / H. A.
h m	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		h m
4 9	−31 53	49	−31 48	49	−31 44	49	−31 40	49	−31 35	49	−31 31	49	19 51
12	31 4	49	30 59	49	30 55	49	30 51	49	30 46	48	30 42	48	48
15	30 15	50	30 10	50	30 6	50	30 2	49	29 58	49	29 54	49	45
18	29 25	50	29 20	50	29 16	50	29 13	50	29 9	50	29 5	50	42
21	28 35	50	28 30	50	28 26	50	28 23	50	28 19	50	28 15	49	39
4 24	−27 45	50	−27 40	50	−27 36	50	−27 33	51	−27 29	50	−27 26	50	19 36
27	26 55	51	26 50	50	26 46	50	26 42	50	26 39	51	26 36	51	33
30	26 4	51	26 0	51	25 56	51	25 52	51	25 48	50	25 45	50	30
33	25 13	51	25 9	51	25 5	51	25 1	51	24 58	51	24 55	51	27
36	24 22	52	24 18	52	24 14	51	24 10	51	24 7	51	24 4	51	24
4 39	−23 30	52	−23 26	52	−23 23	52	−23 19	52	−23 16	52	−23 13	51	19 21
42	22 38	52	22 34	52	22 31	52	22 27	51	22 24	51	22 22	51	18
45	21 46	52	21 42	52	21 39	52	21 36	52	21 33	52	21 31	52	15
48	20 54	53	20 50	52	20 47	52	20 44	52	20 41	52	20 39	52	12
51	20 1	53	19 58	52	19 55	52	19 52	52	19 49	52	19 47	52	9
4 54	−19 8	53	−19 6	53	−19 3	52	−19 0	52	−18 57	52	−18 55	52	19 6
4 57	18 15	53	18 13	53	18 11	53	18 8	53	18 5	53	18 3	53	3
5 0	17 22	53	17 20	53	17 18	53	17 15	53	17 12	52	17 10	52	19 0
3	16 29	53	16 27	53	16 25	53	16 22	53	16 20	53	16 18	53	18 57
6	15 36	54	15 34	53	15 32	53	15 29	53	15 27	53	15 25	53	54
5 9	−14 42	54	−14 41	54	−14 39	53	−14 36	53	−14 34	53	−14 32	53	18 51
12	13 48	54	13 47	54	13 46	54	13 43	53	13 41	53	13 39	53	48
15	12 54	54	12 53	54	12 52	54	12 50	54	12 48	54	12 46	53	45
18	12 0	54	11 59	54	11 58	54	11 56	54	11 54	54	11 53	54	42
21	11 6	54	11 5	54	11 4	54	11 2	54	11 0	53	10 59	53	39
5 24	−10 12	54	−10 11	54	−10 10	54	−10 8	54	−10 7	54	−10 6	54	18 36
27	9 18	54	9 17	54	9 16	54	9 14	53	9 13	54	9 12	54	33
30	8 24	54	8 23	54	8 22	54	8 21	54	8 19	53	8 18	53	30
33	7 30	55	7 29	54	7 28	54	7 27	54	7 26	54	7 25	54	27
36	6 35	54	6 35	54	6 34	54	6 33	54	6 32	54	6 31	54	24
5 39	− 5 41	55	− 5 41	55	− 5 40	55	− 5 39	55	− 5 38	55	− 5 37	54	18 21
42	4 46	55	4 46	55	4 45	55	4 44	55	4 43	54	4 43	54	18
45	3 51	55	3 51	55	3 50	54	3 49	54	3 49	54	3 49	54	15
48	2 56	55	2 56	55	2 56	55	2 55	54	2 55	54	2 55	54	12
51	2 1	55	2 1	55	2 1	55	2 1	55	2 1	55	2 1	54	9
5 54	− 1 6	54	− 1 6	54	− 1 6	54	− 1 6	54	− 1 6	54	− 1 7	54	18 6
5 57	− 0 12	54	− 0 12	54	− 0 12	54	− 0 12	54	− 0 12	54	− 0 13	54	3
6 0	+ 0 42	55	+ 0 42	55	+ 0 42	54	+ 0 42	54	+ 0 42	53	+ 0 41	54	18 0
3	1 37	54	1 37	54	1 36	54	1 36	54	1 35	54	1 35	54	17 57
6	2 31	55	2 31	55	2 30	55	2 30	54	2 29	55	2 29	54	54
6 9	+ 3 26	54	+ 3 26	54	+ 3 25	54	+ 3 24	54	+ 3 24	54	+ 3 23	54	17 51
12	4 20	55	4 20	55	4 19	55	4 18	55	4 18	54	4 17	54	48
15	5 15	55	5 15	54	5 14	54	5 13	54	5 12	54	5 11	54	45
18	6 10	54	6 9	55	6 8	54	6 7	54	6 6	54	6 5	54	42
21	7 4	55	7 4	54	7 2	54	7 1	54	7 0	54	6 59	54	39
6 24	+ 7 59	55	+ 7 58	54	+ 7 56	54	+ 7 55	54	+ 7 54	53	+ 7 53	53	17 36
27	8 54	54	8 52	54	8 50	54	8 49	54	8 47	54	8 46	54	33
30	9 48	54	9 46	54	9 44	54	9 43	54	9 41	54	9 40	53	30
33	10 42	54	10 40	54	10 38	54	10 37	53	10 35	53	10 33	53	27
36	11 36	54	11 34	54	11 32	54	11 30	54	11 28	54	11 26	54	24
6 39	+12 30	54	+12 28	54	+12 26	54	+12 24	54	+12 22	54	+12 20	53	17 21
42	13 24	53	13 22	53	13 20	53	13 18	53	13 16	53	13 13	53	18
45	14 17	53	14 15	53	14 13	53	14 11	53	14 9	52	14 6	52	15
48	15 10	53	15 8	53	15 6	53	15 4	53	15 1	53	14 58	53	12
51	16 3	53	16 1	53	15 59	53	15 57	52	15 54	52	15 51	53	9
6 54	+16 56	53	+16 54	52	+16 52	52	+16 49	52	+16 46	52	+16 44	52	17 6
6 57	17 49	53	17 46	52	17 44	52	17 41	52	17 38	52	17 36	52	3
7 0	18 42	52	18 38	52	18 36	52	18 33	52	18 30	52	18 28	52	17 0
3	19 34	52	19 30	52	19 28	52	19 25	52	19 22	52	19 20	51	16 57
7 6	+20 26		+20 22		+20 20		+20 17		+20 14		+20 11		16 54

TABLE I.

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1913.

H. A. \ Decl.	88° 50′ 20″		88° 50′ 30″		88° 50′ 40″		88° 50′ 50″		88° 51′ 0″		88° 51′ 10″		Decl. / H. A.
h m	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		h m
7 6	+20 26	52	+20 22	52	+20 20	52	+20 17	52	+20 14	52	+20 11	52	16 54
9	21 18	52	21 14	52	21 12	52	21 9	52	21 6	51	21 3	51	51
12	22 10	52	22 6	52	22 4	51	22 1	51	21 57	51	21 54	51	48
15	23 2	51	22 58	51	22 55	51	22 52	51	22 48	51	22 45	51	45
18	23 53	51	23 49	51	23 46	51	23 43	51	23 39	51	23 36	50	42
7 21	+24 44	51	+24 40	51	+24 37	51	+24 34	50	+24 30	50	+24 26	50	16 39
24	25 35	51	25 31	51	25 28	50	25 24	50	25 20	50	25 16	50	36
27	26 26	50	26 22	50	26 18	50	26 14	50	26 10	50	26 6	50	33
30	27 16	50	27 12	50	27 8	50	27 4	49	27 0	49	26 56	49	30
33	28 6	50	28 2	49	27 58	49	27 53	49	27 49	49	27 45	49	27
7 36	+28 56	49	+28 51	49	+28 47	49	+28 42	49	+28 38	49	+28 34	49	16 24
39	29 45	49	29 40	49	29 36	49	29 31	49	29 27	49	29 23	49	21
42	30 34	49	30 29	49	30 25	49	30 20	49	30 16	48	30 12	48	18
45	31 23	48	31 18	48	31 14	48	31 9	48	31 4	48	31 0	48	15
48	32 11	48	32 6	48	32 2	48	31 57	48	31 52	48	31 48	48	12
7 51	+32 59	48	+32 54	48	+32 50	47	+32 45	47	+32 40	47	+32 36	47	16 9
54	33 47	48	33 42	48	33 37	47	33 32	47	33 27	47	33 23	47	6
7 57	34 35	47	34 30	47	34 24	47	34 19	47	34 14	47	34 10	46	3
8 0	35 22	47	35 17	47	35 11	47	35 6	47	35 1	46	34 56	46	16 0
3	36 9	46	36 4	46	35 58	46	35 53	46	35 47	46	35 42	46	15 57
8 6	+36 55	46	+36 50	46	+36 44	46	+36 39	46	+36 33	46	+36 28	46	15 54
9	37 41	46	37 36	46	37 30	46	37 25	45	37 19	45	37 14	45	51
12	38 27	45	38 22	45	38 16	45	38 10	45	38 4	45	37 59	44	48
15	39 12	45	39 7	45	39 1	44	38 55	44	38 49	44	38 43	45	45
18	39 57	44	39 52	44	39 45	44	39 39	44	39 33	44	39 28	43	42
8 21	+40 41	44	+40 36	44	+40 29	44	+40 23	43	+40 17	43	+40 11	44	15 39
24	41 25	44	41 20	43	41 13	43	41 6	43	41 0	43	40 55	43	36
27	42 9	43	42 3	43	41 56	43	41 49	43	41 43	43	41 38	42	33
30	42 52	42	42 46	42	42 39	42	42 32	42	42 26	42	42 20	43	30
33	43 34	42	43 28	42	43 21	42	43 14	42	43 8	42	43 3	41	27
8 36	+44 16	42	+44 10	41	+44 3	42	+43 56	42	+43 50	42	+43 44	42	15 24
39	44 58	41	44 51	41	44 45	41	44 38	41	44 32	40	44 26	40	21
42	45 39	41	45 32	41	45 26	41	45 19	41	45 12	41	45 6	41	18
45	46 20	40	46 13	40	46 7	40	46 0	40	45 53	40	45 47	40	15
48	47 0	40	46 53	40	46 47	40	46 40	40	46 33	40	46 27	39	12
8 51	+47 40	39	+47 33	39	+47 27	39	+47 20	39	+47 13	39	+47 6	39	15 9
54	48 19	39	48 12	39	48 6	39	47 59	39	47 52	38	47 45	38	6
8 57	48 58	39	48 51	39	48 45	38	48 38	38	48 30	38	48 23	38	3
9 0	49 37	38	49 30	38	49 23	38	49 16	37	49 8	38	49 1	38	15 0
3	50 15	38	50 8	37	50 1	37	49 53	37	49 46	37	49 39	37	14 57
9 6	+50 53	37	+50 45	37	+50 38	37	+50 30	36	+50 23	36	+50 16	36	14 54
9	51 30	36	51 22	36	51 15	36	51 6	36	50 59	36	50 52	36	51
12	52 6	36	51 58	36	51 51	35	51 42	36	51 35	35	51 28	35	48
15	52 42	35	52 34	35	52 26	35	52 18	35	52 10	35	52 3	35	45
18	53 17	35	53 9	35	53 1	35	52 53	34	52 45	34	52 38	34	42
9 21	+53 52	34	+53 44	34	+53 36	34	+53 27	34	+53 19	34	+53 12	34	14 39
24	54 26	33	54 18	33	54 10	33	54 1	33	53 53	33	53 46	33	36
27	54 59	33	54 51	33	54 43	33	54 34	33	54 26	33	54 19	33	33
30	55 32	33	55 24	33	55 16	33	55 7	33	54 59	33	54 52	32	30
33	56 5	32	55 57	32	55 49	32	55 40	32	55 32	32	55 24	32	27
9 36	+56 37	32	+56 29	32	+56 21	31	+56 12	31	+56 4	31	+55 56	31	14 24
39	57 9	31	57 1	31	56 52	31	56 43	31	56 35	30	56 27	30	21
42	57 40	30	57 32	30	57 23	30	57 14	30	57 5	30	56 57	30	18
45	58 10	29	58 2	29	57 53	29	57 44	29	57 35	29	57 27	29	15
48	58 39	29	58 31	29	58 22	29	58 13	29	58 4	29	57 56	29	12
9 51	+59 8	28	+59 0	28	+58 51	28	+58 42	28	+58 33	28	+58 25	28	14 9
54	59 36	28	59 28	27	59 19	27	59 10	27	59 1	27	58 53	27	6
9 57	60 4	27	59 55	27	59 46	27	59 37	27	59 28	27	59 20	27	3
10 0	60 31	26	60 22	26	60 13	26	60 4	26	59 55	26	59 47	26	14 0
10 3	+60 57		+60 48		+60 39		+60 30		+60 21		+60 13		13 57

TABLE I.

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1913.

Decl. / H. A.	88° 50′ 20″		88° 50′ 30″		88° 50′ 40″		88° 50′ 50″		88° 51′ 0″		88° 51′ 10″		Decl. / H. A.
h m	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		h m
10 3	+60 57	26	+60 48	26	+60 39	26	+60 30	26	+60 21	26	+60 13	26	13 57
6	61 23	25	61 14	25	61 5	25	60 56	25	60 47	25	60 39	25	54
9	61 48	25	61 39	25	61 30	25	61 21	25	61 12	25	61 4	24	51
12	62 13	24	62 4	24	61 55	24	61 46	24	61 37	24	61 28	24	48
15	62 37	23	62 28	23	62 19	23	62 10	23	62 1	23	61 52	23	45
10 18	+63 0	23	+62 51	23	+62 42	23	+62 33	23	+62 24	23	+62 15	23	13 42
21	63 23	22	63 14	22	63 5	22	62 56	22	62 47	22	62 38	22	39
24	63 45	22	63 36	22	63 27	21	63 18	21	63 9	21	63 0	21	36
27	64 7	21	63 58	21	63 48	21	63 39	21	63 30	21	63 21	21	33
30	64 28	20	64 19	20	64 9	20	64 0	20	63 51	20	63 42	20	30
10 33	+64 48	20	+64 39	20	+64 29	20	+64 20	20	+64 11	19	+64 2	19	13 27
36	65 8	19	64 59	19	64 49	19	64 40	19	64 30	19	64 21	19	24
39	65 27	18	65 18	18	65 8	18	64 59	18	64 49	18	64 40	18	21
42	65 45	18	65 36	18	65 26	18	65 17	18	65 7	18	64 58	17	18
45	66 3	17	65 54	17	65 44	17	65 35	17	65 25	17	65 15	17	15
10 48	+66 20	16	+66 11	16	+66 1	16	+65 52	16	+65 42	16	+65 32	16	13 12
51	66 36	16	66 27	15	66 17	15	66 8	15	65 58	15	65 48	15	9
54	66 52	15	66 42	15	66 32	15	66 23	15	66 13	15	66 3	15	6
10 57	67 7	14	66 57	14	66 47	14	66 38	14	66 28	14	66 18	14	3
11 0	67 21	14	67 11	14	67 1	14	66 52	13	66 42	13	66 32	13	13 0
11 3	+67 35	13	+67 25	13	+67 15	13	+67 5	13	+66 55	13	+66 45	13	12 57
6	67 48	12	67 38	12	67 28	12	67 18	12	67 8	12	66 58	12	54
9	68 0	11	67 50	11	67 40	11	67 30	11	67 20	11	67 10	12	51
12	68 11	11	68 1	11	67 51	11	67 41	11	67 31	11	67 22	10	48
15	68 22	10	68 12	10	68 2	10	67 52	10	67 42	10	67 32	10	45
11 18	+68 32	9	+68 22	9	+68 12	9	+68 2	9	+67 52	9	+67 42	10	12 42
21	68 41	9	68 31	9	68 21	9	68 11	9	68 1	9	67 52	8	39
24	68 50	8	68 40	8	68 30	8	68 20	8	68 10	8	68 0	8	36
27	68 58	7	68 48	7	68 38	7	68 28	7	68 18	7	68 8	7	33
30	69 5	7	68 55	7	68 45	7	68 35	7	68 25	7	68 15	7	30
11 33	+69 12	6	+69 2	6	+68 52	6	+68 42	6	+68 32	6	+68 22	6	12 27
36	69 18	5	69 8	5	68 58	5	68 48	5	68 38	5	68 28	5	24
39	69 23	4	69 13	4	69 3	4	68 53	4	68 43	4	68 33	5	21
42	69 27	4	69 17	4	69 7	4	68 57	4	68 47	4	68 38	3	18
45	69 31	3	69 21	3	69 11	3	69 1	3	68 51	3	68 41	3	15
11 48	+69 34	2	+69 24	2	+69 14	2	+69 4	2	+68 54	2	+68 44	3	12 12
51	69 36	2	69 26	2	69 16	2	69 6	2	68 56	2	68 47	2	9
54	69 38	1	69 28	1	69 18	1	69 8	1	68 58	1	68 49	0	6
11 57	69 39	1	69 29	1	69 19	1	69 9	1	68 59	1	68 49	1	3
12 0	+69 40		+69 30		+69 20		+69 10		+69 0		+68 50		12 0

TABLE Ia.

Table I has been computed for an altitude of 45°. For other altitudes, corrections taken from the following table may be applied when the desired degree of accuracy requires it.

H. A.		Altitude. 10°	20°	30°	40°	50°	60°	70°	Altitude. H. A.	
h	h	″	″	″	″	″	″	″	h	h
0	12	0	0	0	0	0	0	0	12	24
1	11	− 3	− 2	− 2	−1	0	+ 2	+ 5	13	23
2	10	9	7	5	2	+2	8	18	14	22
3	9	17	13	9	4	4	16	36	15	21
4	8	26	20	13	5	6	24	55	16	20
5	7	32	25	16	7	8	28	68	17	19
6	6	−35	−27	−18	−7	+8	+30	+73	18	18

TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Sidereal.	0^h	1^h	2^h	3^h	4^h	5^h	6^h	7^h	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	0 0.000	0 9.830	0 19.659	0 29.489	0 39.318	0 49.148	0 58.977	1 8.807	0	0.000
1	0 0.164	0 9.993	0 19.823	0 29.653	0 39.482	0 49.312	0 59.141	1 8.971	1	0.003
2	0 0.328	0 10.157	0 19.987	0 29.816	0 39.646	0 49.475	0 59.305	1 9.135	2	0.005
3	0 0.491	0 10.321	0 20.151	0 29.980	0 39.810	0 49.639	0 59.469	1 9.298	3	0.008
4	0 0.655	0 10.485	0 20.314	0 30.144	0 39.974	0 49.803	0 59.633	1 9.462	4	0.011
5	0 0.819	0 10.649	0 20.478	0 30.308	0 40.137	0 49.967	0 59.796	1 9.626	5	0.014
6	0 0.983	0 10.813	0 20.642	0 30.472	0 40.301	0 50.131	0 59.960	1 9.790	6	0.016
7	0 1.147	0 10.976	0 20.806	0 30.635	0 40.465	0 50.295	1 0.124	1 9.954	7	0.019
8	0 1.311	0 11.140	0 20.970	0 30.799	0 40.629	0 50.458	1 0.288	1 10.118	8	0.022
9	0 1.474	0 11.304	0 21.134	0 30.963	0 40.793	0 50.622	1 0.452	1 10.281	9	0.025
10	0 1.638	0 11.468	0 21.297	0 31.127	0 40.956	0 50.786	1 0.616	1 10.445	10	0.027
11	0 1.802	0 11.632	0 21.461	0 31.291	0 41.120	0 50.950	1 0.779	1 10.609	11	0.030
12	0 1.966	0 11.795	0 21.625	0 31.455	0 41.284	0 51.114	1 0.943	1 10.773	12	0.033
13	0 2.130	0 11.959	0 21.789	0 31.618	0 41.448	0 51.278	1 1.107	1 10.937	13	0.035
14	0 2.294	0 12.123	0 21.953	0 31.782	0 41.612	0 51.441	1 1.271	1 11.100	14	0.038
15	0 2.457	0 12.287	0 22.117	0 31.946	0 41.776	0 51.605	1 1.435	1 11.264	15	0.041
16	0 2.621	0 12.451	0 22.280	0 32.110	0 41.939	0 51.769	1 1.599	1 11.428	16	0.044
17	0 2.785	0 12.615	0 22.444	0 32.274	0 42.103	0 51.933	1 1.762	1 11.592	17	0.046
18	0 2.949	0 12.778	0 22.608	0 32.438	0 42.267	0 52.097	1 1.926	1 11.756	18	0.049
19	0 3.113	0 12.942	0 22.772	0 32.601	0 42.431	0 52.260	1 2.090	1 11.920	19	0.052
20	0 3.277	0 13.106	0 22.936	0 32.765	0 42.595	0 52.424	1 2.254	1 12.083	20	0.055
21	0 3.440	0 13.270	0 23.099	0 32.929	0 42.759	0 52.588	1 2.418	1 12.247	21	0.057
22	0 3.604	0 13.434	0 23.263	0 33.093	0 42.922	0 52.752	1 2.582	1 12.411	22	0.060
23	0 3.768	0 13.598	0 23.427	0 33.257	0 43.086	0 52.916	1 2.745	1 12.575	23	0.063
24	0 3.932	0 13.761	0 23.591	0 33.420	0 43.250	0 53.080	1 2.909	1 12.739	24	0.066
25	0 4.096	0 13.925	0 23.755	0 33.584	0 43.414	0 53.243	1 3.073	1 12.903	25	0.068
26	0 4.259	0 14.089	0 23.919	0 33.748	0 43.578	0 53.407	1 3.237	1 13.066	26	0.071
27	0 4.423	0 14.253	0 24.082	0 33.912	0 43.742	0 53.571	1 3.401	1 13.230	27	0.074
28	0 4.587	0 14.417	0 24.246	0 34.076	0 43.905	0 53.735	1 3.564	1 13.394	28	0.076
29	0 4.751	0 14.581	0 24.410	0 34.240	0 44.069	0 53.899	1 3.728	1 13.558	29	0.079
30	0 4.915	0 14.744	0 24.574	0 34.403	0 44.233	0 54.063	1 3.892	1 13.722	30	0.082
31	0 5.079	0 14.908	0 24.738	0 34.567	0 44.397	0 54.226	1 4.056	1 13.886	31	0.085
32	0 5.242	0 15.072	0 24.902	0 34.731	0 44.561	0 54.390	1 4.220	1 14.049	32	0.087
33	0 5.406	0 15.236	0 25.065	0 34.895	0 44.724	0 54.554	1 4.384	1 14.213	33	0.090
34	0 5.570	0 15.400	0 25.229	0 35.059	0 44.888	0 54.718	1 4.547	1 14.377	34	0.093
35	0 5.734	0 15.563	0 25.393	0 35.223	0 45.052	0 54.882	1 4.711	1 14.541	35	0.096
36	0 5.898	0 15.727	0 25.557	0 35.386	0 45.216	0 55.046	1 4.875	1 14.705	36	0.098
37	0 6.062	0 15.891	0 25.721	0 35.550	0 45.380	0 55.209	1 5.039	1 14.868	37	0.101
38	0 6.225	0 16.055	0 25.885	0 35.714	0 45.544	0 55.373	1 5.203	1 15.032	38	0.104
39	0 6.389	0 16.219	0 26.048	0 35.878	0 45.707	0 55.537	1 5.367	1 15.196	39	0.106
40	0 6.553	0 16.383	0 26.212	0 36.042	0 45.871	0 55.701	1 5.530	1 15.360	40	0.109
41	0 6.717	0 16.546	0 26.376	0 36.206	0 46.035	0 55.865	1 5.694	1 15.524	41	0.112
42	0 6.881	0 16.710	0 26.540	0 36.369	0 46.199	0 56.028	1 5.858	1 15.688	42	0.115
43	0 7.045	0 16.874	0 26.704	0 36.533	0 46.363	0 56.192	1 6.022	1 15.851	43	0.117
44	0 7.208	0 17.038	0 26.867	0 36.697	0 46.527	0 56.356	1 6.186	1 16.015	44	0.120
45	0 7.372	0 17.202	0 27.031	0 36.861	0 46.690	0 56.520	1 6.350	1 16.179	45	0.123
46	0 7.536	0 17.366	0 27.195	0 37.025	0 46.854	0 56.684	1 6.513	1 16.343	46	0.126
47	0 7.700	0 17.529	0 27.359	0 37.188	0 47.018	0 56.848	1 6.677	1 16.507	47	0.128
48	0 7.864	0 17.693	0 27.523	0 37.352	0 47.182	0 57.011	1 6.841	1 16.671	48	0.131
49	0 8.027	0 17.857	0 27.687	0 37.516	0 47.346	0 57.175	1 7.005	1 16.834	49	0.134
50	0 8.191	0 18.021	0 27.850	0 37.680	0 47.510	0 57.339	1 7.169	1 16.998	50	0.137
51	0 8.355	0 18.185	0 28.014	0 37.844	0 47.673	0 57.503	1 7.332	1 17.162	51	0.139
52	0 8.519	0 18.349	0 28.178	0 38.008	0 47.837	0 57.667	1 7.496	1 17.326	52	0.142
53	0 8.683	0 18.512	0 28.342	0 38.171	0 48.001	0 57.831	1 7.660	1 17.490	53	0.145
54	0 8.847	0 18.676	0 28.506	0 38.335	0 48.165	0 57.994	1 7.824	1 17.654	54	0.147
55	0 9.010	0 18.840	0 28.670	0 38.499	0 48.329	0 58.158	1 7.988	1 17.817	55	0.150
56	0 9.174	0 19.004	0 28.833	0 38.663	0 48.492	0 58.322	1 8.152	1 17.981	56	0.153
57	0 9.338	0 19.168	0 28.997	0 38.827	0 48.656	0 58.486	1 8.315	1 18.145	57	0.156
58	0 9.502	0 19.331	0 29.161	0 38.991	0 48.820	0 58.650	1 8.479	1 18.309	58	0.158
59	0 9.666	0 19.495	0 29.325	0 39.154	0 48.984	0 58.814	1 8.643	1 18.473	59	0.161
Sidereal.	0^h	1^h	2^h	3^h	4^h	5^h	6^h	7^h	For Seconds.	

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Sidereal.	8^h	9^h	10^h	11^h	12^h	13^h	14^h	15^h	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	1 18.636	1 28.466	1 38.296	1 48.125	1 57.955	2 7.784	2 17.614	2 27.443	0	0.000
1	1 18.800	1 28.630	1 38.459	1 48.289	1 58.119	2 7.948	2 17.778	2 27.607	1	0.003
2	1 18.964	1 28.794	1 38.623	1 48.453	1 58.282	2 8.112	2 17.941	2 27.771	2	0.005
3	1 19.128	1 28.958	1 38.787	1 48.617	1 58.446	2 8.276	2 18.105	2 27.935	3	0.008
4	1 19.292	1 29.121	1 38.951	1 48.780	1 58.610	2 8.440	2 18.269	2 28.099	4	0.011
5	1 19.456	1 29.285	1 39.115	1 48.944	1 58.774	2 8.603	2 18.433	2 28.263	5	0.014
6	1 19.619	1 29.449	1 39.279	1 49.108	1 58.938	2 8.767	2 18.597	2 28.426	6	0.016
7	1 19.783	1 29.613	1 39.442	1 49.272	1 59.101	2 8.931	2 18.761	2 28.590	7	0.019
8	1 19.947	1 29.777	1 39.606	1 49.436	1 59.265	2 9.095	2 18.924	2 28.754	8	0.022
9	1 20.111	1 29.940	1 39.770	1 49.600	1 59.429	2 9.259	2 19.088	2 28.918	9	0.025
10	1 20.275	1 30.104	1 39.934	1 49.763	1 59.593	2 9.423	2 19.252	2 29.082	10	0.027
11	1 20.439	1 30.268	1 40.098	1 49.927	1 59.757	2 9.586	2 19.416	2 29.245	11	0.030
12	1 20.602	1 30.432	1 40.261	1 50.091	1 59.921	2 9.750	2 19.580	2 29.409	12	0.033
13	1 20.766	1 30.596	1 40.425	1 50.255	2 0.084	2 9.914	2 19.744	2 29.573	13	0.035
14	1 20.930	1 30.760	1 40.589	1 50.419	2 0.248	2 10.078	2 19.907	2 29.737	14	0.038
15	1 21.094	1 30.923	1 40.753	1 50.583	2 0.412	2 10.242	2 20.071	2 29.901	15	0.041
16	1 21.258	1 31.087	1 40.917	1 50.746	2 0.576	2 10.405	2 20.235	2 30.065	16	0.044
17	1 21.422	1 31.251	1 41.081	1 50.910	2 0.740	2 10.569	2 20.399	2 30.228	17	0.046
18	1 21.585	1 31.415	1 41.244	1 51.074	2 0.904	2 10.733	2 20.563	2 30.392	18	0.049
19	1 21.749	1 31.579	1 41.408	1 51.238	2 1.067	2 10.897	2 20.727	2 30.556	19	0.052
20	1 21.913	1 31.743	1 41.572	1 51.402	2 1.231	2 11.061	2 20.890	2 30.720	20	0.055
21	1 22.077	1 31.906	1 41.736	1 51.565	2 1.395	2 11.225	2 21.054	2 30.884	21	0.057
22	1 22.241	1 32.070	1 41.900	1 51.729	2 1.559	2 11.388	2 21.218	2 31.048	22	0.060
23	1 22.404	1 32.234	1 42.064	1 51.893	2 1.723	2 11.552	2 21.382	2 31.211	23	0.063
24	1 22.568	1 32.398	1 42.227	1 52.057	2 1.887	2 11.716	2 21.546	2 31.375	24	0.066
25	1 22.732	1 32.562	1 42 391	1 52.221	2 2.050	2 11.880	2 21.709	2 31.539	25	0.068
26	1 22.896	1 32.726	1 42.555	1 52.385	2 2.214	2 12.044	2 21.873	2 31.703	26	0.071
27	1 23.060	1 32.889	1 42.719	1 52.548	2 2.378	2 12.208	2 22.037	2 31.867	27	0.074
28	1 23.224	1 33.053	1 42.883	1 52.712	2 2.542	2 12.371	2 22.201	2 32.031	28	0.076
29	1 23.387	1 33.217	1 43.047	1 52.876	2 2.706	2 12.535	2 22.365	2 32.194	29	0.079
30	1 23.551	1 33.381	1 43.210	1 53.040	2 2.869	2 12.699	2 22.529	2 32.358	30	0.082
31	1 23.715	1 33.545	1 43.374	1 53.204	2 3.033	2 12.863	2 22.692	2 32.522	31	0.085
32	1 23.879	1 33.708	1 43.538	1 53.368	2 3.197	2 13.027	2 22.856	2 32.686	32	0.087
33	1 24.043	1 33.872	1 43.702	1 53.531	2 3.361	2 13.191	2 23.020	2 32.850	33	0.090
34	1 24.207	1 34.036	1 43.866	1 53.695	2 3.525	2 13.354	2 23.184	2 33.013	34	0.093
35	1 24.370	1 34.200	1 44.029	1 53.859	2 3.689	2 13.518	2 23.348	2 33.177	35	0.096
36	1 24.534	1 34.364	1 44.193	1 54.023	2 3.852	2 13.682	2 23.512	2 33.341	36	0.098
37	1 24.698	1 34.528	1 44.357	1 54.187	2 4.016	2 13.846	2 23.675	2 33.505	37	0.101
38	1 24.862	1 34.691	1 44.521	1 54.351	2 4.180	2 14.010	2 23.839	2 33.669	38	0.104
39	1 25.026	1 34.855	1 44.685	1 54.514	2 4.344	2 14.173	2 24.003	2 33.833	39	0.106
40	1 25.190	1 35.019	1 44.849	1 54.678	2 4.508	2 14.337	2 24.167	2 33.996	40	0.109
41	1 25.353	1 35.183	1 45.012	1 54.842	2 4.672	2 14.501	2 24.331	2 34.160	41	0.112
42	1 25.517	1 35.347	1 45.176	1 55.006	2 4.835	2 14.665	2 24.495	2 34.324	42	0.115
43	1 25.681	1 35.511	1 45.340	1 55.170	2 4.999	2 14.829	2 24.658	2 34.488	43	0.117
44	1 25.845	1 35.674	1 45.504	1 55.333	2 5.163	2 14.993	2 24.822	2 34.652	44	0.120
45	1 26.009	1 35.838	1 45.668	1 55.497	2 5.327	2 15.156	2 24.986	2 34.816	45	0.123
46	1 26.172	1 36.002	1 45.832	1 55.661	2 5.491	2 15.320	2 25.150	2 34.979	46	0.126
47	1 26.336	1 36.166	1 45.995	1 55.825	2 5.655	2 15.484	2 25.314	2 35.143	47	0.128
48	1 26.500	1 36.330	1 46.159	1 55.989	2 5.818	2 15.648	2 25.477	2 35.307	48	0.131
49	1 26.664	1 36.493	1 46.323	1 56.153	2 5.982	2 15.812	2 25.641	2 35.471	49	0.134
50	1 26.828	1 36.657	1 46.487	1 56.316	2 6.146	2 15.976	2 25.805	2 35.635	50	0.137
51	1 26.992	1 36.821	1 46.651	1 56.480	2 6.310	2 16.139	2 25.969	2 35.798	51	0.139
52	1 27.155	1 36.985	1 46.815	1 56.644	2 6.474	2 16.303	2 26.133	2 35.962	52	0.142
53	1 27.319	1 37.149	1 46.978	1 56.808	2 6.637	2 16.467	2 26.297	2 36.126	53	0.145
54	1 27.483	1 37.313	1 47.142	1 56.972	2 6.801	2 16.631	2 26.460	2 36.290	54	0.147
55	1 27.647	1 37.476	1 47.306	1 57.136	2 6.965	2 16.795	2 26.624	2 36.454	55	0.150
56	1 27.811	1 37.640	1 47.470	1 57.299	2 7.129	2 16.959	2 26.788	2 36.618	56	0.153
57	1 27.975	1 37.804	1 47.634	1 57.463	2 7.293	2 17.122	2 26.952	2 36.781	57	0.156
58	1 28.138	1 37.968	1 47.797	1 57.627	2 7.457	2 17.286	2 27.116	2 36.945	58	0.158
59	1 28.302	1 38.132	1 47.961	1 57.791	2 7.620	2 17.450	2 27.280	2 37.109	59	0.161
Sidereal.	8^h	9^h	10^h	11^h	12^h	13^h	14^h	15^h	For Seconds.	

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Sidereal.	16^h	17^h	18^h	19^h	20^h	21^h	22^h	23^h	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	2 37.273	2 47.102	2 56.932	3 6.762	3 16.591	3 26.421	3 36.250	3 46.080	0	0.000
1	2 37.437	2 47.266	2 57.096	3 6.925	3 16.755	3 26.585	3 36.414	3 46.244	1	0.003
2	2 37.601	2 47.430	2 57.260	3 7.089	3 16.919	3 26.748	3 36.578	3 46.407	2	0.005
3	2 37.764	2 47.594	2 57.424	3 7.253	3 17.083	3 26.912	3 36.742	3 46.571	3	0.008
4	2 37.928	2 47.758	2 57.587	3 7.417	3 17.246	3 27.076	3 36.906	3 46.735	4	0.011
5	2 38.092	2 47.922	2 57.751	3 7.581	3 17.410	3 27.240	3 37.069	3 46.899	5	0.014
6	2 38.256	2 48.085	2 57.915	3 7.745	3 17.574	3 27.404	3 37.233	3 47.063	6	0.016
7	2 38.420	2 48.249	2 58.079	3 7.908	3 17.738	3 27.568	3 37.397	3 47.227	7	0.019
8	2 38.584	2 48.413	2 58.243	3 8.072	3 17.902	3 27.731	3 37.561	3 47.390	8	0.022
9	2 38.747	2 48.577	2 58.406	3 8.236	3 18.066	3 27.895	3 37.725	3 47.554	9	0.025
10	2 38.911	2 48.741	2 58.570	3 8.400	3 18.229	3 28.059	3 37.889	3 47.718	10	0.027
11	2 39.075	2 48.905	2 58.734	3 8.564	3 18.393	3 28.223	3 38.052	3 47.882	11	0.030
12	2 39.239	2 49.068	2 58.898	3 8.728	3 18.557	3 28.387	3 38.216	3 48.046	12	0.033
13	2 39.403	2 49.232	2 59.062	3 8.891	3 18.721	3 28.550	3 38.380	3 48.210	13	0.035
14	2 39.566	2 49.396	2 59.226	3 9.055	3 18.885	3 28.714	3 38.544	3 48.373	14	0.038
15	2 39.730	2 49.560	2 59.389	3 9.219	3 19.049	3 28.878	3 38.708	3 48.537	15	0.041
16	2 39.894	2 49.724	2 59.553	3 9.383	3 19.212	3 29.042	3 38.871	3 48.701	16	0.044
17	2 40.058	2 49.888	2 59.717	3 9.547	3 19.376	3 29.206	3 39.035	3 48.865	17	0.046
18	2 40.222	2 50.051	2 59.881	3 9.710	3 19.540	3 29.370	3 39.199	3 49.029	18	0.049
19	2 40.386	2 50.215	3 0.045	3 9.874	3 19.704	3 29.533	3 39.363	3 49.193	19	0.052
20	2 40.549	2 50.379	3 0.209	3 10.038	3 19.868	3 29.697	3 39.527	3 49.356	20	0.055
21	2 40.713	2 50.543	3 0.372	3 10.202	3 20.032	3 29.861	3 39.691	3 49.520	21	0.057
22	2 40.877	2 50.707	3 0.536	3 10.366	3 20.195	3 30.025	3 39.854	3 49.684	22	0.060
23	2 41.041	2 50.870	3 0.700	3 10.530	3 20.359	3 30.189	3 40.018	3 49.848	23	0.063
24	2 41.205	2 51.034	3 0.864	3 10.693	3 20.523	3 30.353	3 40.182	3 50.012	24	0.066
25	2 41.369	2 51.198	3 1.028	3 10.857	3 20.687	3 30.516	3 40.346	3 50.175	25	0.068
26	2 41.532	2 51.362	3 1.192	3 11.021	3 20.851	3 30.680	3 40.510	3 50.339	26	0.071
27	2 41.696	2 51.526	3 1.355	3 11.185	3 21.014	3 30.844	3 40.674	3 50.503	27	0.074
28	2 41.860	2 51.690	3 1.519	3 11.349	3 21.178	3 31.008	3 40.837	3 50.667	28	0.076
29	2 42.024	2 51.853	3 1.683	3 11.513	3 21.342	3 31.172	3 41.001	3 50.831	29	0.079
30	2 42.188	2 52.017	3 1.847	3 11.676	3 21.506	3 31.336	3 41.165	3 50.995	30	0.082
31	2 42.352	2 52.181	3 2.011	3 11.840	3 21.670	3 31.499	3 41.329	3 51.158	31	0.085
32	2 42.515	2 52.345	3 2.174	3 12.004	3 21.834	3 31.663	3 41.493	3 51.322	32	0.087
33	2 42.679	2 52.509	3 2.338	3 12.168	3 21.997	3 31.827	3 41.657	3 51.486	33	0.090
34	2 42.843	2 52.673	3 2.502	3 12.332	3 22.161	3 31.991	3 41.820	3 51.650	34	0.093
35	2 43.007	2 52.836	3 2.666	3 12.496	3 22.325	3 32.155	3 41.984	3 51.814	35	0.096
36	2 43.171	2 53.000	3 2.830	3 12.659	3 22.489	3 32.318	3 42.148	3 51.978	36	0.098
37	2 43.334	2 53.164	3 2.994	3 12.823	3 22.653	3 32.482	3 42.312	3 52.141	37	0.101
38	2 43.498	2 53.328	3 3.157	3 12.987	3 22.817	3 32.646	3 42.476	3 52.305	38	0.104
39	2 43.662	2 53.492	3 3.321	3 13.151	3 22.980	3 32.810	3 42.639	3 52.469	39	0.106
40	2 43.826	2 53.656	3 3.485	3 13.315	3 23.144	3 32.974	3 42.803	3 52.633	40	0.109
41	2 43.990	2 53.819	3 3.649	3 13.478	3 23.308	3 33.138	3 42.967	3 52.797	41	0.112
42	2 44.154	2 53.983	3 3.813	3 13.642	3 23.472	3 33.301	3 43.131	3 52.961	42	0.115
43	2 44.317	2 54.147	3 3.977	3 13.806	3 23.636	3 33.465	3 43.295	3 53.124	43	0.117
44	2 44.481	2 54.311	3 4.140	3 13.970	3 23.800	3 33.629	3 43.459	3 53.288	44	0.120
45	2 44.645	2 54.475	3 4.304	3 14.134	3 23.963	3 33.793	3 43.622	3 53.452	45	0.123
46	2 44.809	2 54.638	3 4.468	3 14.298	3 24.127	3 33.957	3 43.786	3 53.616	46	0.126
47	2 44.973	2 54.802	3 4.632	3 14.461	3 24.291	3 34.121	3 43.950	3 53.780	47	0.128
48	2 45.137	2 54.966	3 4.796	3 14.625	3 24.455	3 34.284	3 44.114	3 53.943	48	0.131
49	2 45.300	2 55.130	3 4.960	3 14.789	3 24.619	3 34.448	3 44.278	3 54.107	49	0.134
50	2 45.464	2 55.294	3 5.123	3 14.953	3 24.782	3 34.612	3 44.442	3 54.271	50	0.137
51	2 45.628	2 55.458	3 5.287	3 15.117	3 24.946	3 34.776	3 44.605	3 54.435	51	0.139
52	2 45.792	2 55.621	3 5.451	3 15.281	3 25.110	3 34.940	3 44.769	3 54.599	52	0.142
53	2 45.956	2 55.785	3 5.615	3 15.444	3 25.274	3 35.104	3 44.933	3 54.763	53	0.145
54	2 46.120	2 55.949	3 5.779	3 15.608	3 25.438	3 35.267	3 45.097	3 54.926	54	0.147
55	2 46.283	2 56.113	3 5.942	3 15.772	3 25.602	3 35.431	3 45.261	3 55.090	55	0.150
56	2 46.447	2 56.277	3 6.106	3 15.936	3 25.765	3 35.595	3 45.425	3 55.254	56	0.153
57	2 46.611	2 56.441	3 6.270	3 16.100	3 25.929	3 35.759	3 45.588	3 55.418	57	0.156
58	2 46.775	2 56.604	3 6.434	3 16.264	3 26.093	3 35.923	3 45.752	3 55.582	58	0.158
59	2 46.939	2 56.768	3 6.598	3 16.427	3 26.257	3 36.086	3 45.916	3 55.746	59	0.161
Sidereal.	16^h	17^h	18^h	19^h	20^h	21^h	22^h	23^h	For Seconds.	

TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	0^h	1^h	2^h	3^h	4^h	5^h	6^h	7^h	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	0 0.000	0 9.856	0 19.713	0 29.569	0 39.426	0 49.282	0 59.139	1 8.995	0	0.000
1	0 0.164	0 10.021	0 19.877	0 29.734	0 39.590	0 49.447	0 59.303	1 9.160	1	0.003
2	0 0.329	0 10.185	0 20.041	0 29.898	0 39.754	0 49.611	0 59.467	1 9.324	2	0.005
3	0 0.493	0 10.349	0 20.206	0 30.062	0 39.919	0 49.775	0 59.632	1 9.488	3	0.008
4	0 0.657	0 10.514	0 20.370	0 30.227	0 40.083	0 49.939	0 59.796	1 9.652	4	0.011
5	0 0.821	0 10.678	0 20.534	0 30.391	0 40.247	0 50.104	0 59.960	1 9.817	5	0.014
6	0 0.986	0 10.842	0 20.699	0 30.555	0 40.412	0 50.268	1 0.124	1 9.981	6	0.016
7	0 1.150	0 11.006	0 20.863	0 30.719	0 40.576	0 50.432	1 0.289	1 10.145	7	0.019
8	0 1.314	0 11.171	0 21.027	0 30.884	0 40.740	0 50.597	1 0.453	1 10.310	8	0.022
9	0 1.478	0 11.335	0 21.191	0 31.048	0 40.904	0 50.761	1 0.617	1 10.474	9	0.025
10	0 1.643	0 11.499	0 21.356	0 31.212	0 41.069	0 50.925	1 0.782	1 10.638	10	0.027
11	0 1.807	0 11.663	0 21.520	0 31.376	0 41.233	0 51.089	1 0.946	1 10.802	11	0.030
12	0 1.971	0 11.828	0 21.684	0 31.541	0 41.397	0 51.254	1 1.110	1 10.967	12	0.033
13	0 2.136	0 11.992	0 21.849	0 31.705	0 41.561	0 51.418	1 1.274	1 11.131	13	0.036
14	0 2.300	0 12.156	0 22.013	0 31.869	0 41.726	0 51.582	1 1.439	1 11.295	14	0.038
15	0 2.464	0 12.321	0 22.177	0 32.034	0 41.890	0 51.746	1 1.603	1 11.459	15	0.041
16	0 2.628	0 12.485	0 22.341	0 32.198	0 42.054	0 51.911	1 1.767	1 11.624	16	0.044
17	0 2.793	0 12.649	0 22.506	0 32.362	0 42.219	0 52.075	1 1.932	1 11.788	17	0.047
18	0 2.957	0 12.813	0 22.670	0 32.526	0 42.383	0 52.239	1 2.096	1 11.952	18	0.049
19	0 3.121	0 12.978	0 22.834	0 32.691	0 42.547	0 52.404	1 2.260	1 12.117	19	0.052
20	0 3.285	0 13.142	0 22.998	0 32.855	0 42.711	0 52.568	1 2.424	1 12.281	20	0.055
21	0 3.450	0 13.306	0 23.163	0 33.019	0 42.876	0 52.732	1 2.589	1 12.445	21	0.057
22	0 3.614	0 13.471	0 23.327	0 33.183	0 43.040	0 52.896	1 2.753	1 12.609	22	0.060
23	0 3.778	0 13.635	0 23.491	0 33.348	0 43.204	0 53.061	1 2.917	1 12.774	23	0.063
24	0 3.943	0 13.799	0 23.656	0 33.512	0 43.368	0 53.225	1 3.081	1 12.938	24	0.066
25	0 4.107	0 13.963	0 23.820	0 33.676	0 43.533	0 53.389	1 3.246	1 13.102	25	0.068
26	0 4.271	0 14.128	0 23.984	0 33.841	0 43.697	0 53.554	1 3.410	1 13.266	26	0.071
27	0 4.435	0 14.292	0 24.148	0 34.005	0 43.861	0 53.718	1 3.574	1 13.431	27	0.074
28	0 4.600	0 14.456	0 24.313	0 34.169	0 44.026	0 53.882	1 3.739	1 13.595	28	0.077
29	0 4.764	0 14.620	0 24.477	0 34.333	0 44.190	0 54.046	1 3.903	1 13.759	29	0.079
30	0 4.928	0 14.785	0 24.641	0 34.498	0 44.354	0 54.211	1 4.067	1 13.924	30	0.082
31	0 5.093	0 14.949	0 24.805	0 34.662	0 44.518	0 54.375	1 4.231	1 14.088	31	0.085
32	0 5.257	0 15.113	0 24.970	0 34.826	0 44.683	0 54.539	1 4.396	1 14.252	32	0.088
33	0 5.421	0 15.278	0 25.134	0 34.990	0 44.847	0 54.703	1 4.560	1 14.416	33	0.090
34	0 5.585	0 15.442	0 25.298	0 35.155	0 45.011	0 54.868	1 4.724	1 14.581	34	0.093
35	0 5.750	0 15.606	0 25.463	0 35.319	0 45.176	0 55.032	1 4.888	1 14.745	35	0.096
36	0 5.914	0 15.770	0 25.627	0 35.483	0 45.340	0 55.196	1 5.053	1 14.909	36	0.099
37	0 6.078	0 15.935	0 25.791	0 35.648	0 45.504	0 55.361	1 5.217	1 15.073	37	0.101
38	0 6.242	0 16.099	0 25.955	0 35.812	0 45.668	0 55.525	1 5.381	1 15.238	38	0.104
39	0 6.407	0 16.263	0 26.120	0 35.976	0 45.833	0 55.689	1 5.546	1 15.402	39	0.107
40	0 6.571	0 16.427	0 26.284	0 36.140	0 45.997	0 55.853	1 5.710	1 15.566	40	0.110
41	0 6.735	0 16.592	0 26.448	0 36.305	0 46.161	0 56.018	1 5.874	1 15.731	41	0.112
42	0 6.900	0 16.756	0 26.612	0 36.469	0 46.325	0 56.182	1 6.038	1 15.895	42	0.115
43	0 7.064	0 16.920	0 26.777	0 36.633	0 46.490	0 56.346	1 6.203	1 16.059	43	0.118
44	0 7.228	0 17.085	0 26.941	0 36.798	0 46.654	0 56.510	1 6.367	1 16.223	44	0.120
45	0 7.392	0 17.249	0 27.105	0 36.962	0 46.818	0 56.675	1 6.531	1 16.388	45	0.123
46	0 7.557	0 17.413	0 27.270	0 37.126	0 46.983	0 56.839	1 6.695	1 16.552	46	0.126
47	0 7.721	0 17.577	0 27.434	0 37.290	0 47.147	0 57.003	1 6.860	1 16.716	47	0.129
48	0 7.885	0 17.742	0 27.598	0 37.455	0 47.311	0 57.168	1 7.024	1 16.881	48	0.131
49	0 8.049	0 17.906	0 27.762	0 37.619	0 47.475	0 57.332	1 7.188	1 17.045	49	0.134
50	0 8.214	0 18.070	0 27.927	0 37.783	0 47.640	0 57.496	1 7.353	1 17.209	50	0.137
51	0 8.378	0 18.234	0 28.091	0 37.947	0 47.804	0 57.660	1 7.517	1 17.373	51	0.140
52	0 8.542	0 18.399	0 28.255	0 38.112	0 47.968	0 57.825	1 7.681	1 17.538	52	0.142
53	0 8.707	0 18.563	0 28.420	0 38.276	0 48.132	0 57.989	1 7.845	1 17.702	53	0.145
54	0 8.871	0 18.727	0 28.584	0 38.440	0 48.297	0 58.153	1 8.010	1 17.866	54	0.148
55	0 9.035	0 18.892	0 28.748	0 38.605	0 48.461	0 58.317	1 8.174	1 18.030	55	0.151
56	0 9.199	0 19.056	0 28.912	0 38.769	0 48.625	0 58.482	1 8.338	1 18.195	56	0.153
57	0 9.364	0 19.220	0 29.077	0 38.933	0 48.790	0 58.646	1 8.502	1 18.359	57	0.156
58	0 9.528	0 19.384	0 29.241	0 39.097	0 48.954	0 58.810	1 8.667	1 18.523	58	0.159
59	0 9.692	0 19.549	0 29.405	0 39.262	0 49.118	0 58.975	1 8.831	1 18.688	59	0.162
Mean Solar.	0^h	1^h	2^h	3^h	4^h	5^h	6^h	7^h	For Seconds.	

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	8^h	9^h	10^h	11^h	12^h	13^h	14^h	15^h	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	1 18.852	1 28.708	1 38.565	1 48.421	1 58.278	2 8.134	2 17.991	2 27.847	0	0.000
1	1 19.016	1 28.873	1 38.729	1 48.585	1 58.442	2 8.298	2 18.155	2 28.011	1	0.003
2	1 19.180	1 29.037	1 38.893	1 48.750	1 58.606	2 8.463	2 18.319	2 28.176	2	0.005
3	1 19.345	1 29.201	1 39.058	1 48.914	1 58.771	2 8.627	2 18.483	2 28.340	3	0.008
4	1 19.509	1 29.365	1 39.222	1 49.078	1 58.935	2 8.791	2 18.648	2 28.504	4	0.011
5	1 19.673	1 29.530	1 39.386	1 49.243	1 59.099	2 8.956	2 18.812	2 28.668	5	0.014
6	1 19.837	1 29.694	1 39.550	1 49.407	1 59.263	2 9.120	2 18.976	2 28.833	6	0.016
7	1 20.002	1 29.858	1 39.715	1 49.571	1 59.428	2 9.284	2 19.141	2 28.997	7	0.019
8	1 20.166	1 30.022	1 39.879	1 49.735	1 59.592	2 9.448	2 19.305	2 29.161	8	0.022
9	1 20.330	1 30.187	1 40.043	1 49.900	1 59.756	2 9.613	2 19.469	2 29.326	9	0.025
10	1 20.495	1 30.351	1 40.207	1 50.064	1 59.920	2 9.777	2 19.633	2 29.490	10	0.027
11	1 20.659	1 30.515	1 40.372	1 50.228	2 0.085	2 9.941	2 19.798	2 29.654	11	0.030
12	1 20.823	1 30.680	1 40.536	1 50.393	2 0.249	2 10.105	2 19.962	2 29.818	12	0.033
13	1 20.987	1 30.844	1 40.700	1 50.557	2 0.413	2 10.270	2 20.126	2 29.983	13	0.036
14	1 21.152	1 31.008	1 40.865	1 50.721	2 0.578	2 10.434	2 20.290	2 30.147	14	0.038
15	1 21.316	1 31.172	1 41.029	1 50.885	2 0.742	2 10.598	2 20.455	2 30.311	15	0.041
16	1 21.480	1 31.337	1 41.193	1 51.050	2 0.906	2 10.763	2 20.619	2 30.476	16	0.044
17	1 21.644	1 31.501	1 41.357	1 51.214	2 1.070	2 10.927	2 20.783	2 30.640	17	0.047
18	1 21.809	1 31.665	1 41.522	1 51.378	2 1.235	2 11.091	2 20.948	2 30.804	18	0.049
19	1 21.973	1 31.829	1 41.686	1 51.542	2 1.399	2 11.255	2 21.112	2 30.968	19	0.052
20	1 22.137	1 31.994	1 41.850	1 51.707	2 1.563	2 11.420	2 21.276	2 31.133	20	0.055
21	1 22.302	1 32.158	1 42.015	1 51.871	2 1.727	2 11.584	2 21.440	2 31.297	21	0.057
22	1 22.466	1 32.322	1 42.179	1 52.035	2 1.892	2 11.748	2 21.605	2 31.461	22	0.060
23	1 22.630	1 32.487	1 42.343	1 52.200	2 2.056	2 11.912	2 21.769	2 31.625	23	0.063
24	1 22.794	1 32.651	1 42.507	1 52.364	2 2.220	2 12.077	2 21.933	2 31.790	24	0.066
25	1 22.959	1 32.815	1 42.672	1 52.528	2 2.385	2 12.241	2 22.098	2 31.954	25	0.068
26	1 23.123	1 32.979	1 42.836	1 52.692	2 2.549	2 12.405	2 22.262	2 32.118	26	0.071
27	1 23.287	1 33.144	1 43.000	1 52.857	2 2.713	2 12.570	2 22.426	2 32.283	27	0.074
28	1 23.451	1 33.308	1 43.164	1 53.021	2 2.877	2 12.734	2 22.590	2 32.447	28	0.077
29	1 23.616	1 33.472	1 43.329	1 53.185	2 3.042	2 12.898	2 22.755	2 32.611	29	0.079
30	1 23.780	1 33.637	1 43.493	1 53.349	2 3.206	2 13.062	2 22.919	2 32.775	30	0.082
31	1 23.944	1 33.801	1 43.657	1 53.514	2 3.370	2 13.227	2 23.083	2 32.940	31	0.085
32	1 24.109	1 33.965	1 43.822	1 53.678	2 3.534	2 13.391	2 23.247	2 33.104	32	0.088
33	1 24.273	1 34.129	1 43.986	1 53.842	2 3.699	2 13.555	2 23.412	2 33.268	33	0.090
34	1 24.437	1 34.294	1 44.150	1 54.007	2 3.863	2 13.720	2 23.576	2 33.432	34	0.093
35	1 24.601	1 34.458	1 44.314	1 54.171	2 4.027	2 13.884	2 23.740	2 33.597	35	0.096
36	1 24.766	1 34.622	1 44.479	1 54.335	2 4.192	2 14.048	2 23.905	2 33.761	36	0.099
37	1 24.930	1 34.786	1 44.643	1 54.499	2 4.356	2 14.212	2 24.069	2 33.925	37	0.101
38	1 25.094	1 34.951	1 44.807	1 54.664	2 4.520	2 14.377	2 24.233	2 34.090	38	0.104
39	1 25.259	1 35.115	1 44.971	1 54.828	2 4.684	2 14.541	2 24.397	2 34.254	39	0.107
40	1 25.423	1 35.279	1 45.136	1 54.992	2 4.849	2 14.705	2 24.562	2 34.418	40	0.110
41	1 25.587	1 35.444	1 45.300	1 55.156	2 5.013	2 14.869	2 24.726	2 34.582	41	0.112
42	1 25.751	1 35.608	1 45.464	1 55.321	2 5.177	2 15.034	2 24.890	2 34.747	42	0.115
43	1 25.916	1 35.772	1 45.629	1 55.485	2 5.342	2 15.198	2 25.054	2 34.911	43	0.118
44	1 26.080	1 35.936	1 45.793	1 55.649	2 5.506	2 15.362	2 25.219	2 35.075	44	0.120
45	1 26.244	1 36.101	1 45.957	1 55.814	2 5.670	2 15.527	2 25.383	2 35.239	45	0.123
46	1 26.408	1 36.265	1 46.121	1 55.978	2 5.834	2 15.691	2 25.547	2 35.404	46	0.126
47	1 26.573	1 36.429	1 46.286	1 56.142	2 5.999	2 15.855	2 25.712	2 35.568	47	0.129
48	1 26.737	1 36.593	1 46.450	1 56.306	2 6.163	2 16.019	2 25.876	2 35.732	48	0.131
49	1 26.901	1 36.758	1 46.614	1 56.471	2 6.327	2 16.184	2 26.040	2 35.897	49	0.134
50	1 27.066	1 36.922	1 46.778	1 56.635	2 6.491	2 16.348	2 26.204	2 36.061	50	0.137
51	1 27.230	1 37.086	1 46.943	1 56.799	2 6.656	2 16.512	2 26.369	2 36.225	51	0.140
52	1 27.394	1 37.251	1 47.107	1 56.964	2 6.820	2 16.676	2 26.533	2 36.389	52	0.142
53	1 27.558	1 37.415	1 47.271	1 57.128	2 6.984	2 16.841	2 26.697	2 36.554	53	0.145
54	1 27.723	1 37.579	1 47.436	1 57.292	2 7.149	2 17.005	2 26.861	2 36.718	54	0.148
55	1 27.887	1 37.743	1 47.600	1 57.456	2 7.313	2 17.169	2 27.026	2 36.882	55	0.151
56	1 28.051	1 37.908	1 47.764	1 57.621	2 7.477	2 17.334	2 27.190	2 37.047	56	0.153
57	1 28.215	1 38.072	1 47.928	1 57.785	2 7.641	2 17.498	2 27.354	2 37.211	57	0.156
58	1 28.380	1 38.236	1 48.093	1 57.949	2 7.806	2 17.662	2 27.519	2 37.375	58	0.159
59	1 28.544	1 38.400	1 48.257	1 58.113	2 7.970	2 17.826	2 27.683	2 37.539	59	0.162
Mean Solar.	8^h	9^h	10^h	11^h	12^h	13^h	14^h	15^h	For Seconds.	

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	16^{h}	17^{h}	18^{h}	19^{h}	20^{h}	21^{h}	22^{h}	23^{h}	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	2 37.704	2 47.560	2 57.417	3 7.273	3 17.129	3 26.986	3 36.842	3 46.699	0	0.000
1	2 37.868	2 47.724	2 57.581	3 7.437	3 17.294	3 27.150	3 37.007	3 46.863	1	0.003
2	2 38.032	2 47.889	2 57.745	3 7.602	3 17.458	3 27.315	3 37.171	3 47.027	2	0.005
3	2 38.196	2 48.053	2 57.909	3 7.766	3 17.622	3 27.479	3 37.335	3 47.192	3	0.008
4	2 38.361	2 48.217	2 58.074	3 7.930	3 17.787	3 27.643	3 37.500	3 47.356	4	0.011
5	2 38.525	2 48.381	2 58.238	3 8.094	3 17.951	3 27.807	3 37.664	3 47.520	5	0.014
6	2 38.689	2 48.546	2 58.402	3 8.259	3 18.115	3 27.972	3 37.828	3 47.685	6	0.016
7	2 38.854	2 48.710	2 58.566	3 8.423	3 18.279	3 28.136	3 37.992	3 47.849	7	0.019
8	2 39.018	2 48.874	2 58.731	3 8.587	3 18.444	3 28.300	3 38.157	3 48.013	8	0.022
9	2 39.182	2 49.039	2 58.895	3 8.751	3 18.608	3 28.464	3 38.321	3 48.177	9	0.025
10	2 39.346	2 49.203	2 59.059	3 8.916	3 18.772	3 28.629	3 38.485	3 48.342	10	0.027
11	2 39.511	2 49.367	2 59.224	3 9.080	3 18.937	3 28.793	3 38.649	3 48.506	11	0.030
12	2 39.675	2 49.531	2 59.388	3 9.244	3 19.101	3 28.957	3 38.814	3 48.670	12	0.033
13	2 39.839	2 49.696	2 59.552	3 9.409	3 19.265	3 29.122	3 38.978	3 48.834	13	0.036
14	2 40.003	2 49.860	2 59.716	3 9.573	3 19.429	3 29.286	3 39.142	3 48.999	14	0.038
15	2 40.168	2 50.024	2 59.881	3 9.737	3 19.594	3 29.450	3 39.307	3 49.163	15	0.041
16	2 40.332	2 50.188	3 0.045	3 9.901	3 19.758	3 29.614	3 39.471	3 49.327	16	0.044
17	2 40.496	2 50.353	3 0.209	3 10.066	3 19.922	3 29.779	3 39.635	3 49.492	17	0.047
18	2 40.661	2 50.517	3 0.373	3 10.230	3 20.086	3 29.943	3 39.799	3 49.656	18	0.049
19	2 40.825	2 50.681	3 0.538	3 10.394	3 20.251	3 30.107	3 39.964	3 49.820	19	0.052
20	2 40.989	2 50.846	3 0.702	3 10.559	3 20.415	3 30.271	3 40.128	3 49.984	20	0.055
21	2 41.153	2 51.010	3 0.866	3 10.723	3 20.579	3 30.436	3 40.292	3 50.149	21	0.057
22	2 41.318	2 51.174	3 1.031	3 10.887	3 20.744	3 30.600	3 40.456	3 50.313	22	0.060
23	2 41.482	2 51.338	3 1.195	3 11.051	3 20.908	3 30.764	3 40.621	3 50.477	23	0.063
24	2 41.646	2 51.503	3 1.359	3 11.216	3 21.072	3 30.929	3 40.785	3 50.642	24	0.066
25	2 41.810	2 51.667	3 1.523	3 11.380	3 21.236	3 31.093	3 40.949	3 50.806	25	0.068
26	2 41.975	2 51.831	3 1.688	3 11.544	3 21.401	3 31.257	3 41.114	3 50.970	26	0.071
27	2 42.139	2 51.995	3 1.852	3 11.708	3 21.565	3 31.421	3 41.278	3 51.134	27	0.074
28	2 42.303	2 52.160	3 2.016	3 11.873	3 21.729	3 31.586	3 41.442	3 51.299	28	0.077
29	2 42.468	2 52.324	3 2.181	3 12.037	3 21.893	3 31.750	3 41.606	3 51.463	29	0.079
30	2 42.632	2 52.488	3 2.345	3 12.201	3 22.058	3 31.914	3 41.771	3 51.627	30	0.082
31	2 42.796	2 52.653	3 2.509	3 12.366	3 22.222	3 32.078	3 41.935	3 51.791	31	0.085
32	2 42.960	2 52.817	3 2.673	3 12.530	3 22.386	3 32.243	3 42.099	3 51.956	32	0.088
33	2 43.125	2 52.981	3 2.838	3 12.694	3 22.551	3 32.407	3 42.264	3 52.120	33	0.090
34	2 43.289	2 53.145	3 3.002	3 12.858	3 22.715	3 32.571	3 42.428	3 52.284	34	0.093
35	2 43.453	2 53.310	3 3.166	3 13.023	3 22.879	3 32.736	3 42.592	3 52.449	35	0.096
36	2 43.617	2 53.474	3 3.330	3 13.187	3 23.043	3 32.900	3 42.756	3 52.613	36	0.099
37	2 43.782	2 53.638	3 3.495	3 13.351	3 23.208	3 33.064	3 42.921	3 52.777	37	0.101
38	2 43.946	2 53.803	3 3.659	3 13.515	3 23.372	3 33.228	3 43.085	3 52.941	38	0.104
39	2 44.110	2 53.967	3 3.823	3 13.680	3 23.536	3 33.393	3 43.249	3 53.106	39	0.107
40	2 44.275	2 54.131	3 3.988	3 13.844	3 23.700	3 33.557	3 43.413	3 53.270	40	0.110
41	2 44.439	2 54.295	3 4.152	3 14.008	3 23.865	3 33.721	3 43.578	3 53.434	41	0.112
42	2 44.603	2 54.460	3 4.316	3 14.173	3 24.029	3 33.886	3 43.742	3 53.598	42	0.115
43	2 44.767	2 54.624	3 4.480	3 14.337	3 24.193	3 34.050	3 43.906	3 53.763	43	0.118
44	2 44.932	2 54.788	3 4.645	3 14.501	3 24.358	3 34.214	3 44.071	3 53.927	44	0.120
45	2 45.096	2 54.952	3 4.809	3 14.665	3 24.522	3 34.378	3 44.235	3 54.091	45	0.123
46	2 45.260	2 55.117	3 4.973	3 14.830	3 24.686	3 34.543	3 44.399	3 54.256	46	0.126
47	2 45.425	2 55.281	3 5.137	3 14.994	3 24.850	3 34.707	3 44.563	3 54.420	47	0.129
48	2 45.589	2 55.445	3 5.302	3 15.158	3 25.015	3 34.871	3 44.728	3 54.584	48	0.131
49	2 45.753	2 55.610	3 5.466	3 15.322	3 25.179	3 35.035	3 44.892	3 54.748	49	0.134
50	2 45.917	2 55.774	3 5.630	3 15.487	3 25.343	3 35.200	3 45.056	3 54.913	50	0.137
51	2 46.082	2 55.938	3 5.795	3 15.651	3 25.508	3 35.364	3 45.220	3 55.077	51	0.140
52	2 46.246	2 56.102	3 5.959	3 15.815	3 25.672	3 35.528	3 45.385	3 55.241	52	0.142
53	2 46.410	2 56.267	3 6.123	3 15.980	3 25.836	3 35.693	3 45.549	3 55.405	53	0.145
54	2 46.574	2 56.431	3 6.287	3 16.144	3 26.000	3 35.857	3 45.713	3 55.570	54	0.148
55	2 46.739	2 56.595	3 6.452	3 16.308	3 26.165	3 36.021	3 45.878	3 55.734	55	0.151
56	2 46.903	2 56.759	3 6.616	3 16.472	3 26.329	3 36.185	3 46.042	3 55.898	56	0.153
57	2 47.067	2 56.924	3 6.780	3 16.637	3 26.493	3 36.350	3 46.206	3 56.063	57	0.156
58	2 47.232	2 57.088	3 6.944	3 16.801	3 26.657	3 36.514	3 46.370	3 56.227	58	0.159
59	2 47.396	2 57.252	3 7.109	3 16.965	3 26.822	3 36.678	3 46.535	3 56.391	59	0.162
Mean Solar.	16^{h}	17^{h}	18^{h}	19^{h}	20^{h}	21^{h}	22^{h}	23^{h}	For Seconds.	

TABLE IV.

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1913.

[For hour angles 0^h to 12^h the star is west of north, and for hour angles 12^h to 24^h it is east of north.]

H. A.	Lat.	10°	15°	20°	25°	30°	35°	40°	45°	50°	Lat.	H. A.
h	m	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	h	m
0	0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	24	0
	12	0 3.7	0 3.8	0 3.9	0 4.0	0 4.2	0 4.5	0 4.8	0 5.2	0 5.8	23	48
	24	0 7.3	0 7.5	0 7.8	0 8.1	0 8.5	0 9.0	0 9.6	0 10.5	0 11.5		36
	36	0 11.0	0 11.3	0 11.6	0 12.1	0 12.7	0 13.4	0 14.4	0 15.6	0 17.3		24
	48	0 14.7	0 15.0	0 15.5	0 16.0	0 16.8	0 17.8	0 19.1	0 20.8	0 22.9		12
1	0	0 18.2	0 18.7	0 19.2	0 20.0	0 20.9	0 22.2	0 23.8	0 25.9	0 28.6	23	0
	12	0 21.8	0 22.3	0 22.9	0 23.8	0 25.0	0 26.5	0 28.4	0 30.9	0 34.1	22	48
	24	0 25.2	0 25.8	0 26.6	0 27.6	0 29.0	0 30.7	0 32.9	0 35.8	0 39.5		36
	36	0 28.7	0 29.3	0 30.2	0 31.4	0 32.9	0 34.8	0 37.4	0 40.6	0 44.8		24
	48	0 32.0	0 32.7	0 33.7	0 35.0	0 36.7	0 38.9	0 41.7	0 45.3	0 50.0		12
2	0	0 35.3	0 36.0	0 37.1	0 38.5	0 40.4	0 42.8	0 45.9	0 49.9	0 55.0	22	0
	12	0 38.4	0 39.2	0 40.4	0 42.0	0 44.0	0 46.6	0 50.0	0 54.3	0 59.9	21	48
	24	0 41.5	0 42.3	0 43.6	0 45.3	0 47.5	0 50.3	0 53.9	0 58.5	1 4.6		36
	36	0 44.4	0 45.3	0 46.7	0 48.5	0 50.8	0 53.8	0 57.7	1 2.6	1 9.1		24
	48	0 47.2	0 48.2	0 49.6	0 51.5	0 54.0	0 57.2	1 1.3	1 6.5	1 13.4		12
3	0	0 49.8	0 50.9	0 52.4	0 54.4	0 57.0	1 0.4	1 4.7	1 10.3	1 17.5	21	0
	12	0 52.4	0 53.5	0 55.1	0 57.2	0 59.9	1 3.4	1 8.0	1 13.8	1 21.4	20	48
	24	0 54.8	0 55.9	0 57.6	0 59.8	1 2.6	1 6.3	1 11.0	1 17.1	1 25.0		36
	36	0 57.0	0 58.2	0 59.9	1 2.2	1 5.2	1 9.0	1 13.9	1 20.2	1 28.4		24
	48	0 59.1	1 0.3	1 2.1	1 4.4	1 7.5	1 11.5	1 16.5	1 23.1	1 31.6		12
4	0	1 1.0	1 2.3	1 4.1	1 6.5	1 9.7	1 13.8	1 19.0	1 25.7	1 34.5	20	0
	12	1 2.8	1 4.1	1 5.9	1 8.4	1 11.6	1 15.8	1 21.2	1 28.1	1 37.1	19	48
	24	1 4.3	1 5.7	1 7.5	1 10.1	1 13.4	1 17.7	1 23.2	1 30.2	1 39.4		36
	36	1 5.7	1 7.1	1 9.0	1 11.6	1 15.0	1 19.3	1 24.9	1 32.1	1 41.5		24
	48	1 7.0	1 8.3	1 10.3	1 12.9	1 16.3	1 20.8	1 26.4	1 33.7	1 43.2		12
5	0	1 8.0	1 9.4	1 11.3	1 14.0	1 17.5	1 22.0	1 27.7	1 35.1	1 44.7	19	0
	12	1 8.8	1 10.2	1 12.2	1 14.9	1 18.4	1 23.0	1 28.8	1 36.2	1 45.9	18	48
	24	1 9.5	1 10.9	1 12.9	1 15.6	1 19.1	1 23.7	1 29.5	1 37.1	1 46.8		36
	36	1 10.0	1 11.4	1 13.4	1 16.1	1 19.6	1 24.2	1 30.1	1 37.6	1 47.4		24
	48	1 10.3	1 11.6	1 13.6	1 16.4	1 19.9	1 24.5	1 30.4	1 37.9	1 47.7		12
6	0	1 10.3	1 11.7	1 13.7	1 16.4	1 20.0	1 24.6	1 30.4	1 38.0	1 47.7	18	0
	12	1 10.3	1 11.6	1 13.6	1 16.3	1 19.8	1 24.4	1 30.2	1 37.7	1 47.5	17	48
	24	1 10.0	1 11.3	1 13.3	1 15.9	1 19.5	1 24.0	1 29.8	1 37.2	1 46.9		36
	36	1 9.4	1 10.8	1 12.7	1 15.4	1 18.9	1 23.3	1 29.1	1 36.4	1 46.0		24
	48	1 8.8	1 10.1	1 12.0	1 14.6	1 18.0	1 22.5	1 28.1	1 35.4	1 44.9		12
7	0	1 7.8	1 9.2	1 11.1	1 13.6	1 17.0	1 21.4	1 27.0	1 34.1	1 43.4	17	0
	12	1 6.8	1 8.1	1 10.0	1 12.5	1 15.8	1 20.1	1 25.6	1 32.6	1 41.7	16	48
	24	1 5.5	1 6.8	1 8.6	1 11.1	1 14.4	1 18.5	1 23.9	1 30.8	1 39.7		36
	36	1 4.2	1 5.4	1 7.1	1 9.6	1 12.7	1 16.8	1 22.0	1 28.8	1 37.5		24
	48	1 2.6	1 3.7	1 5.5	1 7.8	1 10.9	1 14.9	1 20.0	1 26.5	1 35.0		12
8	0	1 0.8	1 1.9	1 3.6	1 5.9	1 8.9	1 12.7	1 17.7	1 24.0	1 32.2	16	0
	12	0 58.9	1 0.0	1 1.6	1 3.8	1 6.7	1 10.4	1 15.1	1 21.3	1 29.2	15	48
	24	0 56.8	0 57.8	0 59.4	1 1.5	1 4.3	1 7.9	1 12.4	1 18.3	1 26.0		36
	36	0 54.5	0 55.5	0 57.0	0 59.1	1 1.7	1 5.1	1 9.5	1 15.2	1 22.5		24
	48	0 52.2	0 53.1	0 54.5	0 56.4	0 59.0	1 2.3	1 6.5	1 11.8	1 18.8		12
9	0	0 49.6	0 50.5	0 51.9	0 53.7	0 56.1	0 59.2	1 3.2	1 8.3	1 14.9	15	0
	12	0 46.9	0 47.8	0 49.1	0 50.8	0 53.1	0 56.0	0 59.8	1 4.6	1 10.8	14	48
	24	0 44.2	0 44.9	0 46.1	0 47.8	0 49.9	0 52.6	0 56.2	1 0.7	1 6.6		36
	36	0 41.2	0 42.0	0 43.1	0 44.6	0 46.6	0 49.1	0 52.4	0 56.7	1 2.1		24
	48	0 38.2	0 38.9	0 39.9	0 41.3	0 43.1	0 45.5	0 48.6	0 52.5	0 57.5		12
10	0	0 35.1	0 35.7	0 36.6	0 37.9	0 39.6	0 41.8	0 44.6	0 48.1	0 52.8	14	0
	12	0 31.8	0 32.4	0 33.3	0 34.4	0 35.9	0 37.9	0 40.4	0 43.7	0 47.9	13	48
	24	0 28.5	0 29.0	0 29.8	0 30.8	0 32.2	0 34.0	0 36.2	0 39.1	0 42.9		36
	36	0 25.2	0 25.6	0 26.2	0 27.2	0 28.4	0 29.9	0 31.9	0 34.5	0 37.8		24
	48	0 21.7	0 22.1	0 22.6	0 23.4	0 24.5	0 25.8	0 27.5	0 29.7	0 32.6		12
11	0	0 18.2	0 18.5	0 18.9	0 19.6	0 20.5	0 21.6	0 23.0	0 24.9	0 27.3	13	0
	12	0 14.6	0 14.8	0 15.2	0 15.7	0 16.4	0 17.3	0 18.5	0 20.0	0 21.9	12	48
	24	0 11.0	0 11.2	0 11.5	0 11.8	0 12.4	0 13.0	0 13.9	0 15.0	0 16.5		36
	36	0 7.3	0 7.5	0 7.7	0 7.9	0 8.3	0 8.7	0 9.3	0 10.0	0 11.0		24
	48	0 3.7	0 3.7	0 3.8	0 4.0	0 4.1	0 4.4	0 4.7	0 5.0	0 5.5		12
12	0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	12	0

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1913.

[For hour angles 0ʰ to 12ʰ the star is west of north, and for hour angles 12ʰ to 24ʰ it is east of north.]

H. A.		Lat. 52°	54°	56°	58°	60°	61°	62°	63°	64°	Lat. H. A.	
h	m	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	h	m
0	0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	24	0
	12	0 6.1	0 6.3	0 6.7	0 7.1	0 7.5	0 7.8	0 8.0	0 8.3	0 8.6	23	48
	24	0 12.1	0 12.7	0 13.3	0 14.1	0 15.0	0 15.5	0 16.0	0 16.6	0 17.2		36
	36	0 18.2	0 19.0	0 20.0	0 21.1	0 22.5	0 23.2	0 24.0	0 24.8	0 25.8		24
	48	0 24.0	0 25.2	0 26.5	0 28.1	0 29.8	0 30.8	0 31.9	0 33.0	0 34.2		12
1	0	0 29.9	0 31.3	0 33.0	0 34.9	0 37.1	0 38.3	0 39.6	0 41.1	0 42.6	23	0
	12	0 35.6	0 37.4	0 39.4	0 41.7	0 44.3	0 45.7	0 47.3	0 49.0	0 50.8	22	48
	24	0 41.3	0 43.4	0 45.7	0 48.3	0 51.3	0 53.0	0 54.8	0 56.8	0 58.9		36
	36	0 46.9	0 49.2	0 51.8	0 54.8	0 58.2	1 0.1	1 2.2	1 4.4	1 6.8		24
	48	0 52.3	0 54.9	0 57.8	1 1.1	1 4.9	1 7.0	1 9.3	1 11.8	1 14.5		12
2	0	0 57.5	1 0.4	1 3.6	1 7.2	1 11.4	1 13.8	1 16.3	1 19.0	1 21.9	22	0
	12	1 2.6	1 5.7	1 9.2	1 13.2	1 17.7	1 20.3	1 23.0	1 25.9	1 29.1	21	48
	24	1 7.5	1 10.9	1 14.6	1 18.9	1 23.8	1 26.5	1 29.5	1 32.6	1 36.1		36
	36	1 12.3	1 15.8	1 19.8	1 24.4	1 29.6	1 32.5	1 35.7	1 39.1	1 42.7		24
	48	1 16.8	1 20.5	1 24.8	1 29.6	1 35.2	1 38.3	1 41.6	1 45.2	1 49.1		12
3	0	1 21.0	1 25.0	1 29.5	1 34.6	1 40.4	1 43.7	1 47.2	1 51.0	1 55.1	21	0
	12	1 25.1	1 29.2	1 33.9	1 39.3	1 45.4	1 48.8	1 52.5	1 56.4	2 0.7	20	48
	24	1 28.9	1 33.2	1 38.1	1 43.7	1 50.1	1 53.6	1 57.4	2 1.6	2 6.0		36
	36	1 32.4	1 36.9	1 42.0	1 47.8	1 54.4	1 58.1	2 2.1	2 6.3	2 11.0		24
	48	1 35.7	1 40.3	1 45.6	1 51.6	1 58.4	2 2.2	2 6.3	2 10.7	2 15.5		12
4	0	1 38.7	1 43.5	1 48.9	1 55.0	2 2.1	2 6.0	2 10.2	2 14.8	2 19.7	20	0
	12	1 41.4	1 46.3	1 51.9	1 58.2	2 5.4	2 9.4	2 13.7	2 18.4	2 23.4	19	48
	24	1 43.9	1 48.9	1 54.5	2 1.0	2 8.3	2 12.4	2 16.9	2 21.6	2 26.8		36
	36	1 46.0	1 51.1	1 56.9	2 3.4	2 10.9	2 15.1	2 19.6	2 24.4	2 29.7		24
	48	1 47.9	1 53.0	1 58.9	2 5.5	2 13.2	2 17.4	2 21.9	2 26.8	2 32.2		12
5	0	1 49.4	1 54.6	2 0.6	2 7.3	2 15.0	2 19.3	2 23.9	2 28.8	2 34.2	19	0
	12	1 50.6	1 55.9	2 1.9	2 8.7	2 16.5	2 20.8	2 25.4	2 30.4	2 35.8	18	48
	24	1 51.6	1 56.9	2 2.9	2 9.7	2 17.5	2 21.9	2 26.5	2 31.6	2 37.0		36
	36	1 52.2	1 57.5	2 3.6	2 10.4	2 18.2	2 22.6	2 27.3	2 32.3	2 37.7		24
	48	1 52.5	1 57.8	2 3.9	2 10.7	2 18.6	2 22.9	2 27.6	2 32.6	2 38.1		12
6	0	1 52.5	1 57.8	2 3.8	2 10.7	2 18.5	2 22.8	2 27.5	2 32.5	2 37.9	18	0
	12	1 52.2	1 57.5	2 3.5	2 10.3	2 18.0	2 22.4	2 27.0	2 32.0	2 37.4	17	48
	24	1 51.6	1 56.8	2 2.8	2 9.5	2 17.2	2 21.5	2 26.1	2 31.0	2 36.4		36
	36	1 50.7	1 55.9	2 1.7	2 8.4	2 16.0	2 20.3	2 24.8	2 29.7	2 35.0		24
	48	1 49.4	1 54.6	2 0.4	2 7.0	2 14.5	2 18.6	2 23.1	2 28.0	2 33.2		12
7	0	1 47.9	1 53.0	1 58.7	2 5.2	2 12.6	2 16.7	2 21.1	2 25.8	2 30.9	17	0
	12	1 46.1	1 51.1	1 56.7	2 3.1	2 10.3	2 14.3	2 18.7	2 23.3	2 28.3	16	48
	24	1 44.1	1 48.9	1 54.4	2 0.6	2 7.7	2 11.6	2 15.9	2 20.4	2 25.3		36
	36	1 41.7	1 46.4	1 51.8	1 57.8	2 4.8	2 8.6	2 12.7	2 17.1	2 21.9		24
	48	1 39.1	1 43.7	1 48.9	1 54.8	2 1.5	2 5.2	2 9.2	2 13.5	2 18.2		12
8	0	1 36.2	1 40.7	1 45.7	1 51.4	1 57.9	2 1.5	2 5.4	2 9.5	2 14.0	16	0
	12	1 33.0	1 37.4	1 42.2	1 47.7	1 54.0	1 57.5	2 1.2	2 5.2	2 9.6	15	48
	24	1 29.7	1 33.8	1 38.5	1 43.8	1 49.8	1 53.2	1 56.7	2 0.6	2 4.8		36
	36	1 26.0	1 30.0	1 34.5	1 39.6	1 45.3	1 48.5	1 52.0	1 55.7	1 59.7		24
	48	1 22.2	1 26.0	1 30.2	1 35.1	1 40.6	1 43.6	1 46.9	1 50.4	1 54.2		12
9	0	1 18.1	1 21.7	1 25.8	1 30.4	1 35.6	1 38.5	1 41.6	1 44.9	1 48.5	15	0
	12	1 13.9	1 17.3	1 21.1	1 25.4	1 30.4	1 33.1	1 36.0	1 39.2	1 42.6	14	48
	24	1 9.4	1 12.6	1 16.2	1 20.3	1 24.9	1 27.4	1 30.2	1 33.2	1 36.3		36
	36	1 4.8	1 7.8	1 11.1	1 14.9	1 19.2	1 21.6	1 24.1	1 26.9	1 29.9		24
	48	1 0.0	1 2.7	1 5.8	1 9.3	1 13.3	1 15.5	1 17.9	1 20.4	1 23.2		12
10	0	0 55.0	0 57.5	1 0.4	1 3.6	1 7.2	1 9.3	1 11.4	1 13.8	1 16.3	14	0
	12	0 49.9	0 52.2	0 54.8	0 57.7	1 1.0	1 2.8	1 4.7	1 6.9	1 9.2	13	48
	24	0 44.7	0 46.8	0 49.1	0 51.7	0 54.6	0 56.3	0 58.0	0 59.9	1 1.9		36
	36	0 39.4	0 41.2	0 43.2	0 45.5	0 48.1	0 49.5	0 51.1	0 52.7	0 54.5		24
	48	0 33.9	0 35.5	0 37.2	0 39.2	0 41.4	0 42.7	0 44.0	0 45.4	0 47.0		12
11	0	0 28.4	0 29.7	0 31.2	0 32.8	0 34.7	0 35.7	0 36.8	0 38.0	0 39.3	13	0
	12	0 22.8	0 23.9	0 25.0	0 26.4	0 27.9	0 28.7	0 29.6	0 30.5	0 31.6	12	48
	24	0 17.2	0 17.9	0 18.8	0 19.8	0 21.0	0 21.6	0 22.3	0 23.0	0 23.8		36
	36	0 11.5	0 12.0	0 12.6	0 13.3	0 14.0	0 14.4	0 14.9	0 15.3	0 15.9		24
	48	0 5.7	0 6.0	0 6.3	0 6.6	0 7.0	0 7.2	0 7.4	0 7.7	0 7.9		12
12	0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	12	0

TABLE V.

AZIMUTH OF POLARIS AT ELONGATION, 1913.

Lat. \ Decl.	88° 50′ 20″	88° 50′ 30″	88° 50′ 40″	88° 50′ 50″	88° 51′ 0″	88° 51′ 10″	Variation for—	
							1′ of Lat.	1″ of δ.
° ′	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″	″
5 0	1 9 56.0	1 9 45.9	1 9 35.9	1 9 25.9	1 9 15.8	1 9 5.8	+0.11	−1.00
5 20	1 9 58.2	1 9 48.1	1 9 38.1	1 9 28.0	1 9 18.0	1 9 8.0	0.12	1.00
5 40	1 10 0.5	1 9 50.4	1 9 40.4	1 9 30.4	1 9 20.3	1 9 10.3	0.12	1.00
6 0	1 10 3.0	1 9 52.9	1 9 42.9	1 9 32.9	1 9 22.8	1 9 12.8	0.13	1.00
6 20	1 10 5.7	1 9 55.6	1 9 45.6	1 9 35.5	1 9 25.4	1 9 15.4	0.14	1.01
6 40	1 10 8.5	1 9 58.4	1 9 48.3	1 9 38.3	1 9 28.2	1 9 18.1	+0.14	−1.01
7 0	1 10 11.4	1 10 1.3	1 9 51.2	1 9 41.2	1 9 31.1	1 9 21.0	0.15	1.01
7 20	1 10 14.5	1 10 4.4	1 9 54.3	1 9 44.2	1 9 34.1	1 9 24.1	0.15	1.01
7 40	1 10 17.7	1 10 7.6	1 9 57.5	1 9 47.4	1 9 37.3	1 9 27.3	0.16	1.01
8 0	1 10 21.1	1 10 11.0	1 10 0.9	1 9 50.8	1 9 40.7	1 9 30.6	0.17	1.01
8 20	1 10 24.6	1 10 14.5	1 10 4.4	1 9 54.3	1 9 44.2	1 9 34.1	+0.18	−1.01
8 40	1 10 28.3	1 10 18.2	1 10 8.1	1 9 57.9	1 9 47.8	1 9 37.7	0.19	1.01
9 0	1 10 32.1	1 10 22.0	1 10 11.9	1 10 1.7	1 9 51.6	1 9 41.5	0.20	1.01
9 20	1 10 36.1	1 10 26.0	1 10 15.8	1 10 5.7	1 9 55.5	1 9 45.4	0.20	1.01
9 40	1 10 40.2	1 10 30.1	1 10 19.9	1 10 9.8	1 9 59.6	1 9 49.5	0.21	1.01
10 0	1 10 44.5	1 10 34.3	1 10 24.2	1 10 14.0	1 10 3.8	1 9 53.7	+0.22	−1.02
10 20	1 10 48.9	1 10 38.7	1 10 28.6	1 10 18.4	1 10 8.2	1 9 58.1	0.23	1.02
10 40	1 10 53.5	1 10 43.3	1 10 33.1	1 10 23.0	1 10 12.8	1 10 2.6	0.23	1.02
11 0	1 10 58.2	1 10 48.0	1 10 37.8	1 10 27.7	1 10 17.5	1 10 7.3	0.24	1.02
11 20	1 11 3.1	1 10 52.9	1 10 42.7	1 10 32.5	1 10 22.3	1 10 12.1	0.25	1.02
11 40	1 11 8.2	1 10 57.9	1 10 47.7	1 10 37.5	1 10 27.3	1 10 17.1	+0.26	−1.02
12 0	1 11 13.4	1 11 3.1	1 10 52.9	1 10 42.7	1 10 32.5	1 10 22.3	0.26	1.02
12 20	1 11 18.7	1 11 8.5	1 10 58.3	1 10 48.0	1 10 37.8	1 10 27.6	0.27	1.02
12 40	1 11 24.3	1 11 14.0	1 11 3.8	1 10 53.5	1 10 43.2	1 10 33.0	0.28	1.03
13 0	1 11 30.0	1 11 19.7	1 11 9.4	1 10 59.2	1 10 49.0	1 10 38.7	0.29	1.03
13 20	1 11 35.8	1 11 25.5	1 11 15.2	1 11 5.0	1 10 54.7	1 10 44.4	+0.30	−1.03
13 40	1 11 41.8	1 11 31.5	1 11 21.2	1 11 10.9	1 11 0.6	1 10 50.4	0.31	1.03
14 0	1 11 48.0	1 11 37.7	1 11 27.4	1 11 17.0	1 11 6.7	1 10 56.5	0.31	1.03
14 20	1 11 54.3	1 11 44.0	1 11 33.7	1 11 23.3	1 11 13.0	1 11 2.7	0.32	1.03
14 40	1 12 0.8	1 11 50.5	1 11 40.1	1 11 29.8	1 11 19.4	1 11 9.1	0.33	1.03
15 0	1 12 7.5	1 11 57.1	1 11 46.7	1 11 36.4	1 11 26.0	1 11 15.7	+0.34	−1.04
15 20	1 12 14.3	1 12 3.9	1 11 53.5	1 11 43.2	1 11 32.8	1 11 22.5	0.34	1.04
15 40	1 12 21.3	1 12 10.9	1 12 0.5	1 11 50.1	1 11 39.7	1 11 29.4	0.35	1.04
16 0	1 12 28.5	1 12 18.0	1 12 7.6	1 11 57.2	1 11 46.8	1 11 36.5	0.36	1.04
16 20	1 12 35.8	1 12 25.4	1 12 14.9	1 12 4.5	1 11 54.1	1 11 43.7	0.37	1.04
16 40	1 12 43.3	1 12 32.9	1 12 22.4	1 12 12.0	1 12 1.5	1 11 51.1	+0.38	−1.04
17 0	1 12 51.0	1 12 40.5	1 12 30.1	1 12 19.6	1 12 9.2	1 11 58.7	0.39	1.05
17 20	1 12 58.9	1 12 48.4	1 12 37.9	1 12 27.4	1 12 16.9	1 12 6.5	0.40	1.05
17 40	1 13 6.9	1 12 56.4	1 12 45.9	1 12 35.4	1 12 24.9	1 12 14.4	0.40	1.05
18 0	1 13 15.1	1 13 4.6	1 12 54.1	1 12 43.6	1 12 33.1	1 12 22.6	0.41	1.05
18 20	1 13 23.5	1 13 13.0	1 13 2.5	1 12 51.9	1 12 41.4	1 12 30.9	+0.42	−1.05
18 40	1 13 32.1	1 13 21.6	1 13 11.0	1 13 0.5	1 12 50.0	1 12 39.4	0.43	1.06
19 0	1 13 40.9	1 13 30.3	1 13 19.7	1 13 9.2	1 12 58.6	1 12 48.0	0.44	1.06
19 20	1 13 49.9	1 13 39.2	1 13 28.6	1 13 18.0	1 13 7.4	1 12 56.8	0.45	1.06
19 40	1 13 59.0	1 13 48.3	1 13 37.7	1 13 27.1	1 13 16.5	1 13 5.9	0.46	1.06
20 0	1 14 8.3	1 13 57.6	1 13 47.0	1 13 36.4	1 13 25.7	1 13 15.1	+0.47	−1.06
20 20	1 14 17.8	1 14 7.1	1 13 56.5	1 13 45.8	1 13 35.2	1 13 24.5	0.48	1.07
20 40	1 14 27.5	1 14 16.8	1 14 6.1	1 13 55.4	1 13 44.7	1 13 34.1	0.49	1.07
21 0	1 14 37.4	1 14 26.7	1 14 16.0	1 14 5.3	1 13 54.6	1 13 43.9	0.50	1.07
21 20	1 14 47.5	1 14 36.8	1 14 26.0	1 14 15.3	1 14 4.6	1 13 53.9	0.51	1.07
21 40	1 14 57.8	1 14 47.0	1 14 36.3	1 14 25.5	1 14 14.7	1 14 4.0	+0.52	−1.08
22 0	1 15 8.3	1 14 57.5	1 14 46.7	1 14 36.0	1 14 25.2	1 14 14.4	0.53	1.08
22 20	1 15 19.0	1 15 8.2	1 14 57.4	1 14 46.6	1 14 35.8	1 14 25.0	0.54	1.08
22 40	1 15 29.9	1 15 19.1	1 15 8.2	1 14 57.4	1 14 46.5	1 14 35.7	0.55	1.08
23 0	1 15 41.0	1 15 30.2	1 15 19.3	1 15 8.4	1 14 57.5	1 14 46.7	0.56	1.09
23 20	1 15 52.4	1 15 41.5	1 15 30.6	1 15 19.7	1 15 8.8	1 14 57.9	+0.57	−1.09
23 40	1 16 3.9	1 15 53.0	1 15 42.0	1 15 31.1	1 15 20.2	1 15 9.3	0.58	1.09
24 0	1 16 15.6	1 16 4.7	1 15 53.7	1 15 42.8	1 15 31.8	1 15 20.9	0.59	1.09
24 20	1 16 27.6	1 16 16.6	1 16 5.6	1 15 54.7	1 15 43.7	1 15 32.7	0.60	1.10
24 40	1 16 39.8	1 16 28.7	1 16 17.7	1 16 6.8	1 15 55.8	1 15 44.8	0.61	1.10
25 0	1 16 52.2	1 16 41.1	1 16 30.1	1 16 19.1	1 16 8.0	1 15 57.0	+0.62	−1.10

TABLE V.

AZIMUTH OF POLARIS AT ELONGATION, 1913.

Lat. / Decl.	88° 50′ 20″	88° 50′ 30″	88° 50′ 40″	88° 50′ 50″	88° 51′ 0″	88° 51′ 10″	Variation for— 1′ of Lat.	Variation for— 1″ of δ.
° ′	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″	″
25 0	1 16 52.2	1 16 41.1	1 16 30.1	1 16 19.1	1 16 8.0	1 15 57.0	+0.62	−1.10
25 20	1 17 4.8	1 16 53.7	1 16 42.7	1 16 31.6	1 16 20.5	1 16 9.5	0.64	1.11
25 40	1 17 17.7	1 17 6.6	1 16 55.5	1 16 44.4	1 16 33.3	1 16 22.2	0.65	1.11
26 0	1 17 30.7	1 17 19.6	1 17 8.5	1 16 57.4	1 16 46.2	1 16 35.1	0.66	1.11
26 20	1 17 44.0	1 17 32.9	1 17 21.7	1 17 10.6	1 16 59.4	1 16 48.3	0.67	1.12
26 40	1 17 57.6	1 17 46.4	1 17 35.2	1 17 24.0	1 17 12.8	1 17 1.7	+0.68	−1.12
27 0	1 18 11.4	1 18 0.2	1 17 48.9	1 17 37.7	1 17 26.5	1 17 15.3	0.70	1.12
27 20	1 18 25.4	1 18 14.2	1 18 2.9	1 17 51.6	1 17 40.4	1 17 29.2	0.71	1.13
27 40	1 18 39.7	1 18 28.4	1 18 17.1	1 18 5.8	1 17 54.5	1 17 43.3	0.72	1.13
28 0	1 18 54.2	1 18 42.9	1 18 31.6	1 18 20.2	1 18 8.9	1 17 57.6	0.73	1.13
28 20	1 19 9.0	1 18 57.6	1 18 46.3	1 18 34.9	1 18 23.5	1 18 12.2	+0.74	−1.14
28 40	1 19 24.0	1 19 12.6	1 19 1.2	1 18 49.8	1 18 38.4	1 18 27.0	0.75	1.14
29 0	1 19 39.3	1 19 27.9	1 19 16.4	1 19 5.0	1 18 53.6	1 18 42.2	0.77	1.14
29 20	1 19 54.8	1 19 43.4	1 19 31.9	1 19 20.4	1 19 8.9	1 18 57.5	0.78	1.15
29 40	1 20 10.7	1 19 59.2	1 19 47.6	1 19 36.1	1 19 24.6	1 19 13.1	0.80	1.15
30 0	1 20 26.7	1 20 15.2	1 20 3.6	1 19 52.1	1 19 40.5	1 19 29.0	+0.81	−1.15
30 10	1 20 34.8	1 20 23.3	1 20 11.7	1 20 0.1	1 19 48.6	1 19 37.1	0.82	1.16
30 20	1 20 43.0	1 20 31.5	1 20 19.9	1 20 8.3	1 19 56.7	1 19 45.2	0.82	1.16
30 30	1 20 51.3	1 20 39.7	1 20 28.1	1 20 16.5	1 20 4.9	1 19 53.4	0.83	1.16
30 40	1 20 59.7	1 20 48.1	1 20 36.4	1 20 24.8	1 20 13.2	1 20 1.6	0.84	1.16
30 50	1 21 8.2	1 20 56.5	1 20 44.8	1 20 33.1	1 20 21.5	1 20 9.9	+0.85	−1.16
31 0	1 21 16.7	1 21 5.0	1 20 53.3	1 20 41.6	1 20 30.0	1 20 18.3	0.85	1.17
31 10	1 21 25.3	1 21 13.5	1 21 1.8	1 20 50.1	1 20 38.4	1 20 26.8	0.86	1.17
31 20	1 21 33.9	1 21 22.1	1 21 10.4	1 20 58.7	1 20 47.0	1 20 35.3	0.87	1.17
31 30	1 21 42.6	1 21 30.8	1 21 19.1	1 21 7.4	1 20 55.6	1 20 43.9	0.88	1.17
31 40	1 21 51.3	1 21 39.6	1 21 27.8	1 21 16.1	1 21 4.3	1 20 52.6	+0.88	−1.18
31 50	1 22 0.2	1 21 48.4	1 21 36.6	1 21 24.8	1 21 13.0	1 21 1.3	0.89	1.18
32 0	1 22 9.1	1 21 57.3	1 21 45.5	1 21 33.7	1 21 21.9	1 21 10.1	0.90	1.18
32 10	1 22 18.1	1 22 6.3	1 21 54.5	1 21 42.7	1 21 30.8	1 21 19.0	0.90	1.18
32 20	1 22 27.2	1 22 15.3	1 22 3.5	1 21 51.7	1 21 39.8	1 21 28.0	0.91	1.18
32 30	1 22 36.3	1 22 24.5	1 22 12.6	1 22 0.8	1 21 48.9	1 21 37.0	+0.92	−1.19
32 40	1 22 45.5	1 22 33.7	1 22 21.8	1 22 9.9	1 21 58.0	1 21 46.1	0.93	1.19
32 50	1 22 54.8	1 22 43.0	1 22 31.1	1 22 19.2	1 22 7.2	1 21 55.3	0.93	1.19
33 0	1 23 4.2	1 22 52.3	1 22 40.4	1 22 28.5	1 22 16.5	1 22 4.6	0.94	1.19
33 10	1 23 13.7	1 23 1.8	1 22 49.8	1 22 37.9	1 22 25.9	1 22 13.9	0.95	1.20
33 20	1 23 23.2	1 23 11.3	1 22 59.3	1 22 47.3	1 22 35.3	1 22 23.4	+0.96	−1.20
33 30	1 23 32.9	1 23 20.9	1 23 8.9	1 22 56.9	1 22 44.9	1 22 32.9	0.96	1.20
33 40	1 23 42.6	1 23 30.5	1 23 18.5	1 23 6.5	1 22 54.4	1 22 42.4	0.97	1.20
33 50	1 23 52.3	1 23 40.3	1 23 28.2	1 23 16.2	1 23 4.2	1 22 52.1	0.98	1.20
34 0	1 24 2.2	1 23 50.1	1 23 38.0	1 23 26.0	1 23 13.9	1 23 1.8	0.99	1.21
34 10	1 24 12.2	1 24 0.0	1 23 47.9	1 23 35.8	1 23 23.7	1 23 11.7	+1.00	−1.21
34 20	1 24 22.2	1 24 10.0	1 23 57.9	1 23 45.8	1 23 33.7	1 23 21.6	1.00	1.21
34 30	1 24 32.3	1 24 20.1	1 24 8.0	1 23 55.9	1 23 43.7	1 23 31.5	1.01	1.21
34 40	1 24 42.4	1 24 30.3	1 24 18.1	1 24 6.0	1 23 53.8	1 23 41.6	1.02	1.22
34 50	1 24 52.7	1 24 40.5	1 24 28.3	1 24 16.1	1 24 3.9	1 23 51.7	1.03	1.22
35 0	1 25 3.0	1 24 50.8	1 24 38.6	1 24 26.4	1 24 14.2	1 24 2.0	+1.04	−1.22
35 10	1 25 13.4	1 25 1.2	1 24 49.0	1 24 36.8	1 24 24.5	1 24 12.3	1.05	1.22
35 20	1 25 24.0	1 25 11.7	1 24 59.5	1 24 47.3	1 24 35.0	1 24 22.7	1.06	1.23
35 30	1 25 34.6	1 25 22.3	1 25 10.1	1 24 57.8	1 24 45.5	1 24 33.2	1.06	1.23
35 40	1 25 45.3	1 25 33.0	1 25 20.7	1 25 8.4	1 24 56.0	1 24 43.7	1.07	1.23
35 50	1 25 56.1	1 25 43.8	1 25 31.4	1 25 19.1	1 25 6.7	1 24 54.4	+1.08	−1.23
36 0	1 26 7.0	1 25 54.6	1 25 42.2	1 25 29.9	1 25 17.5	1 25 5.1	1.09	1.24
36 10	1 26 18.0	1 26 5.5	1 25 53.1	1 25 40.7	1 25 28.3	1 25 16.0	1.10	1.24
36 20	1 26 29.0	1 26 16.5	1 26 4.1	1 25 51.7	1 25 39.3	1 25 26.9	1.11	1.24
36 30	1 26 40.1	1 26 27.6	1 26 15.2	1 26 2.8	1 25 50.3	1 25 37.9	1.12	1.24
36 40	1 26 51.3	1 26 38.9	1 26 26.4	1 26 14.0	1 26 1.5	1 25 49.0	+1.13	−1.25
36 50	1 27 2.7	1 26 50.2	1 26 37.7	1 26 25.2	1 26 12.7	1 26 0.2	1.14	1.25
37 0	1 27 14.1	1 27 1.6	1 26 49.1	1 26 36.6	1 26 24.0	1 26 11.5	1.15	1.25
37 10	1 27 25.6	1 27 13.1	1 27 0.6	1 26 48.1	1 26 35.5	1 26 22.9	1.15	1.25
37 20	1 27 37.2	1 27 24.7	1 27 12.1	1 26 59.6	1 26 47.0	1 26 34.4	1.16	1.26
37 30	1 27 48.9	1 27 36.3	1 27 23.7	1 27 11.1	1 26 58.5	1 26 46.0	+1.17	−1.26

TABLE V.

AZIMUTH OF POLARIS AT ELONGATION, 1913.

Decl. / Lat.	88° 50′ 20″	88° 50′ 30″	88° 50′ 40″	88° 50′ 50″	88° 51′ 0″	88° 51′ 10″	Variation for—	
							1′ of Lat.	1″ of δ.
° ′	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″	″
37 30	1 27 48.9	1 27 36.3	1 27 23.7	1 27 11.1	1 26 58.5	1 26 46.0	+1.17	−1.26
37 40	1 28 0.8	1 27 48.1	1 27 35.5	1 27 22.9	1 27 10.2	1 26 57.6	1.18	1.26
37 50	1 28 12.7	1 28 0.0	1 27 47.4	1 27 34.7	1 27 22.0	1 27 9.4	1.19	1.27
38 0	1 28 24.7	1 28 12.0	1 27 59.3	1 27 46.6	1 27 33.9	1 27 21.3	1.20	1.27
38 10	1 28 36.8	1 28 24.0	1 28 11.3	1 27 58.6	1 27 45.9	1 27 33.2	1.21	1.27
38 20	1 28 49.0	1 28 36.2	1 28 23.5	1 28 10.8	1 27 58.0	1 27 45.3	+1.22	−1.27
38 30	1 29 1.4	1 28 48.5	1 28 35.8	1 28 23.0	1 28 10.2	1 27 57.5	1.23	1.28
38 40	1 29 13.8	1 29 0.9	1 28 48.1	1 28 35.3	1 28 22.5	1 28 9.7	1.24	1.28
38 50	1 29 26.2	1 29 13.4	1 29 0.5	1 28 47.7	1 28 34.9	1 28 22.1	1.25	1.28
39 0	1 29 38.9	1 29 26.0	1 29 13.1	1 29 0.3	1 28 47.4	1 28 34.5	1.26	1.29
39 10	1 29 51.6	1 29 38.7	1 29 25.8	1 29 12.9	1 29 0.0	1 28 47.1	+1.27	−1.29
39 20	1 30 4.4	1 29 51.5	1 29 38.6	1 29 25.6	1 29 12.7	1 28 59.8	1.28	1.29
39 30	1 30 17.4	1 30 4.4	1 29 51.4	1 29 38.4	1 29 25.5	1 29 12.6	1.30	1.30
39 40	1 30 30.4	1 30 17.4	1 30 4.3	1 29 51.3	1 29 38.4	1 29 25.5	1.31	1.30
39 50	1 30 43.5	1 30 30.5	1 30 17.4	1 30 4.4	1 29 51.5	1 29 38.5	1.32	1.30
40 0	1 30 56.8	1 30 43.7	1 30 30.6	1 30 17.5	1 30 4.5	1 29 51.6	+1.33	−1.31
40 10	1 31 10.2	1 30 57.0	1 30 43.9	1 30 30.8	1 30 17.8	1 30 4.8	1.34	1.31
40 20	1 31 23.7	1 31 10.5	1 30 57.4	1 30 44.3	1 30 31.2	1 30 18.1	1.35	1.31
40 30	1 31 37.3	1 31 24.1	1 31 11.0	1 30 57.8	1 30 44.7	1 30 31.6	1.36	1.32
40 40	1 31 51.0	1 31 37.9	1 31 24.7	1 31 11.5	1 30 58.3	1 30 45.1	1.37	1.32
40 50	1 32 4.8	1 31 51.7	1 31 38.4	1 31 25.2	1 31 12.0	1 30 58.8	+1.38	−1.32
41 0	1 32 18.8	1 32 5.6	1 31 52.3	1 31 39.1	1 31 25.8	1 31 12.6	1.39	1.33
41 10	1 32 32.9	1 32 19.6	1 32 6.3	1 31 53.0	1 31 39.7	1 31 26.5	1.40	1.33
41 20	1 32 47.0	1 32 33.7	1 32 20.4	1 32 7.1	1 31 53.8	1 31 40.5	1.42	1.33
41 30	1 33 1.4	1 32 48.0	1 32 34.6	1 32 21.3	1 32 8.0	1 31 54.7	1.43	1.34
41 40	1 33 15.8	1 33 2.4	1 32 49.0	1 32 35.6	1 32 22.2	1 32 8.9	+1.44	−1.34
41 50	1 33 30.4	1 33 17.0	1 33 3.5	1 32 50.0	1 32 36.6	1 32 23.3	1.45	1.34
42 0	1 33 45.0	1 33 31.6	1 33 18.1	1 33 4.6	1 32 51.2	1 32 37.8	1.47	1.35
42 10	1 33 59.8	1 33 46.4	1 33 32.8	1 33 19.3	1 33 5.8	1 32 52.4	1.48	1.35
42 20	1 34 14.8	1 34 1.3	1 33 47.7	1 33 34.2	1 33 20.6	1 33 7.1	1.50	1.35
42 30	1 34 29.9	1 34 16.3	1 34 2.7	1 33 49.1	1 33 35.5	1 33 22.0	+1.51	−1.36
42 40	1 34 45.0	1 34 31.4	1 34 17.8	1 34 4.2	1 33 50.6	1 33 37.0	1.52	1.36
42 50	1 35 0.3	1 34 46.7	1 34 33.0	1 34 19.4	1 34 5.7	1 33 52.1	1.54	1.36
43 0	1 35 15.8	1 35 2.1	1 34 48.4	1 34 34.7	1 34 21.0	1 34 7.4	1.55	1.37
43 10	1 35 31.4	1 35 17.6	1 35 3.9	1 34 50.1	1 34 36.4	1 34 22.8	1.56	1.37
43 20	1 35 47.1	1 35 33.3	1 35 19.5	1 35 5.7	1 34 52.0	1 34 38.3	+1.57	−1.38
43 30	1 36 2.9	1 35 49.1	1 35 35.3	1 35 21.5	1 35 7.7	1 34 54.0	1.58	1.38
43 40	1 36 18.9	1 36 5.1	1 35 51.2	1 35 37.4	1 35 23.5	1 35 9.7	1.60	1.38
43 50	1 36 35.0	1 36 21.1	1 36 7.2	1 35 53.3	1 35 39.5	1 35 25.7	1.61	1.39
44 0	1 36 51.3	1 36 37.3	1 36 23.4	1 36 9.4	1 35 55.5	1 35 41.7	1.62	1.39
44 10	1 37 7.7	1 36 53.7	1 36 39.7	1 36 25.7	1 36 11.8	1 35 57.9	+1.63	−1.40
44 20	1 37 24.2	1 37 10.2	1 36 56.2	1 36 42.2	1 36 28.2	1 36 14.3	1.65	1.40
44 30	1 37 40.9	1 37 26.8	1 37 12.8	1 36 58.8	1 36 44.8	1 36 30.8	1.66	1.40
44 40	1 37 57.7	1 37 43.6	1 37 29.6	1 37 15.5	1 37 1.5	1 36 47.4	1.68	1.41
44 50	1 38 14.7	1 38 0.6	1 37 46.5	1 37 32.4	1 37 18.3	1 37 4.2	1.70	1.41
45 0	1 38 31.9	1 38 17.7	1 38 3.6	1 37 49.5	1 37 35.3	1 37 21.1	+1.72	−1.42
45 10	1 38 49.2	1 38 35.0	1 38 20.8	1 38 6.7	1 37 52.4	1 37 38.2	1.73	1.42
45 20	1 39 6.6	1 38 52.4	1 38 38.1	1 38 23.9	1 38 9.6	1 37 55.4	1.75	1.42
45 30	1 39 24.1	1 39 9.9	1 38 55.6	1 38 41.3	1 38 27.0	1 38 12.8	1.76	1.43
45 40	1 39 41.8	1 39 27.5	1 39 13.2	1 38 58.9	1 38 44.6	1 38 30.3	1.78	1.43
45 50	1 39 59.7	1 39 45.4	1 39 31.0	1 39 16.7	1 39 2.3	1 38 48.0	+1.80	−1.44
46 0	1 40 17.8	1 40 3.4	1 39 49.0	1 39 34.6	1 39 20.2	1 39 5.8	1.82	1.44
46 10	1 40 36.0	1 40 21.6	1 40 7.1	1 39 52.7	1 39 38.2	1 39 23.8	1.83	1.44
46 20	1 40 54.4	1 40 39.9	1 40 25.4	1 40 10.9	1 39 56.4	1 39 41.9	1.85	1.45
46 30	1 41 13.0	1 40 58.4	1 40 43.9	1 40 29.3	1 40 14.8	1 40 0.3	1.87	1.45
46 40	1 41 31.7	1 41 17.1	1 41 2.5	1 40 47.9	1 40 33.3	1 40 18.7	+1.88	−1.46
46 50	1 41 50.5	1 41 36.0	1 41 21.3	1 41 6.7	1 40 52.0	1 40 37.4	1.90	1.46
47 0	1 42 9.5	1 41 54.9	1 41 40.2	1 41 25.6	1 41 10.9	1 40 56.2	1.91	1.47
47 10	1 42 28.7	1 42 14.0	1 41 59.3	1 41 44.6	1 41 29.9	1 41 15.2	1.93	1.47
47 20	1 42 48.1	1 42 33.3	1 42 18.6	1 42 3.9	1 41 49.1	1 41 34.3	1.95	1.48
47 30	1 43 7.7	1 42 52.9	1 42 38.1	1 42 23.3	1 42 8.5	1 41 53.7	+1.96	−1.48

TABLE V.

AZIMUTH OF POLARIS AT ELONGATION, 1913.

Lat. \ Decl.	88° 50′ 20″	88° 50′ 30″	88° 50′ 40″	88° 50′ 50″	88° 51′ 0″	88° 51′ 10″	Variation for—	
							1′ of Lat.	1″ of δ.
° ′	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″	″
47 30	1 43 7.7	1 42 52.9	1 42 38.1	1 42 23.3	1 42 8.5	1 41 53.7	+1.96	−1.48
47 40	1 43 27.4	1 43 12.5	1 42 57.7	1 42 42.9	1 42 28.0	1 42 13.2	1.98	1.49
47 50	1 43 47.3	1 43 32.4	1 43 17.5	1 43 2.6	1 42 47.7	1 42 32.8	2.00	1.49
48 0	1 44 7.4	1 43 52.5	1 43 37.5	1 43 22.6	1 43 7.6	1 42 52.7	2.02	1.50
48 10	1 44 27.7	1 44 12.7	1 43 57.7	1 43 42.7	1 43 27.7	1 43 12.7	2.04	1.50
48 20	1 44 48.2	1 44 33.1	1 44 18.1	1 44 3.0	1 43 48.0	1 43 33.0	+2.06	−1.51
48 30	1 45 8.9	1 44 53.8	1 44 38.7	1 44 23.6	1 44 8.5	1 43 53.4	2.07	1.51
48 40	1 45 29.7	1 45 14.6	1 44 59.5	1 44 44.4	1 44 29.2	1 44 14.0	2.09	1.52
48 50	1 45 50.7	1 45 35.6	1 45 20.4	1 45 5.3	1 44 50.0	1 44 34.7	2.11	1.52
49 0	1 46 11.9	1 45 56.7	1 45 41.5	1 45 26.3	1 45 11.0	1 44 55.7	2.13	1.53
49 10	1 46 33.3	1 46 18.1	1 46 2.8	1 45 47.5	1 45 32.2	1 45 16.9	+2.15	−1.53
49 20	1 46 55.0	1 46 39.6	1 46 24.3	1 46 9.0	1 45 53.6	1 45 38.3	2.17	1.54
49 30	1 47 16.9	1 47 1.4	1 46 46.0	1 46 30.6	1 46 15.2	1 45 59.8	2.19	1.54
49 40	1 47 38.9	1 47 23.4	1 47 7.9	1 46 52.4	1 46 37.0	1 46 21.6	2.21	1.55
49 50	1 48 1.1	1 47 45.6	1 47 30.0	1 47 14.5	1 46 59.0	1 46 43.6	2.23	1.55
50 0	1 48 23.6	1 48 8.0	1 47 52.4	1 47 36.8	1 47 21.3	1 47 5.8	+2.25	−1.56
50 10	1 48 46.2	1 48 30.6	1 48 14.9	1 47 59.3	1 47 43.7	1 47 28.1	2.27	1.56
50 20	1 49 9.1	1 48 53.4	1 48 37.7	1 48 22.0	1 48 6.3	1 47 50.7	2.30	1.57
50 30	1 49 32.2	1 49 16.4	1 49 0.7	1 48 45.0	1 48 29.2	1 48 13.5	2.32	1.57
50 40	1 49 55.5	1 49 39.7	1 49 23.9	1 49 8.1	1 48 52.3	1 48 36.6	2.34	1.58
50 50	1 50 19.0	1 50 3.2	1 49 47.3	1 49 31.5	1 49 15.6	1 48 59.8	+2.36	−1.58
51 0	1 50 42.8	1 50 26.9	1 50 10.9	1 49 55.0	1 49 39.1	1 49 23.3	2.38	1.59
51 10	1 51 6.8	1 50 50.8	1 50 34.8	1 50 18.8	1 50 2.9	1 49 47.0	2.40	1.60
51 20	1 51 31.0	1 51 15.0	1 50 58.9	1 50 42.9	1 50 26.9	1 50 10.9	2.42	1.60
51 30	1 51 55.4	1 51 39.4	1 51 23.2	1 51 7.2	1 50 51.1	1 50 35.1	2.45	1.61
51 40	1 52 20.1	1 52 4.0	1 51 47.8	1 51 31.7	1 51 15.6	1 50 59.5	+2.47	−1.61
51 50	1 52 45.0	1 52 28.8	1 52 12.6	1 51 56.5	1 51 40.3	1 51 24.1	2.50	1.62
52 0	1 53 10.2	1 52 53.9	1 52 37.7	1 52 21.5	1 52 5.2	1 51 49.0	2.52	1.62
52 10	1 53 35.6	1 53 19.3	1 53 3.0	1 52 46.7	1 52 30.4	1 52 14.1	2.54	1.63
52 20	1 54 1.2	1 53 44.9	1 53 28.5	1 53 12.1	1 52 55.7	1 52 39.4	2.57	1.64
52 30	1 54 27.2	1 54 10.8	1 53 54.3	1 53 37.9	1 53 21.5	1 53 5.0	+2.60	−1.64
52 40	1 54 53.4	1 54 36.9	1 54 20.4	1 54 3.9	1 53 47.4	1 53 30.9	2.62	1.65
52 50	1 55 19.9	1 55 3.3	1 54 46.7	1 54 30.1	1 54 13.5	1 53 57.0	2.65	1.66
53 0	1 55 46.6	1 55 30.0	1 55 13.3	1 54 56.6	1 54 40.0	1 54 23.4	2.67	1.66
53 10	1 56 13.5	1 55 56.9	1 55 40.1	1 55 23.4	1 55 6.7	1 54 50.0	2.70	1.67
53 20	1 56 40.7	1 56 24.0	1 56 7.2	1 55 50.4	1 55 33.6	1 55 16.9	+2.73	−1.68
53 30	1 57 8.2	1 56 51.4	1 56 34.6	1 56 17.7	1 56 0.9	1 55 44.1	2.75	1.68
53 40	1 57 36.0	1 57 19.1	1 57 2.2	1 56 45.3	1 56 28.4	1 56 11.5	2.78	1.69
53 50	1 58 4.0	1 57 47.0	1 57 30.1	1 57 13.1	1 56 56.2	1 56 39.3	2.81	1.70
54 0	1 58 32.3	1 58 15.2	1 57 58.3	1 57 41.3	1 57 24.3	1 57 7.3	2.84	1.70
54 10	1 59 0.9	1 58 43.8	1 58 26.8	1 58 9.7	1 57 52.6	1 57 35.5	+2.87	−1.71
54 20	1 59 29.9	1 59 12.7	1 58 55.6	1 58 38.4	1 58 21.2	1 58 4.1	2.90	1.72
54 30	1 59 59.1	1 59 41.9	1 59 24.7	1 59 7.5	1 58 50.2	1 58 33.0	2.93	1.72
54 40	2 0 28.6	2 0 11.4	1 59 54.1	1 59 36.8	1 59 19.5	1 59 2.2	2.96	1.73
54 50	2 0 58.5	2 0 41.1	2 0 23.8	2 0 6.4	1 59 49.0	1 59 31.6	3.00	1.74
55 0	2 1 28.6	2 1 11.2	2 0 53.8	2 0 36.4	2 0 18.9	2 0 1.4	+3.03	−1.74
55 10	2 1 59.1	2 1 41.6	2 1 24.1	2 1 6.6	2 0 49.0	2 0 31.5	3.06	1.75
55 20	2 2 29.8	2 2 12.3	2 1 54.7	2 1 37.1	2 1 19.5	2 1 1.9	3.09	1.76
55 30	2 3 0.9	2 2 43.3	2 2 25.6	2 2 8.0	2 1 50.3	2 1 32.6	3.12	1.76
55 40	2 3 32.3	2 3 14.6	2 2 56.9	2 2 39.2	2 2 21.5	2 2 3.7	3.15	1.77
55 50	2 4 4.1	2 3 46.3	2 3 28.5	2 3 10.7	2 2 52.8	2 2 35.0	+3.18	−1.78
56 0	2 4 36.2	2 4 18.3	2 4 0.4	2 3 42.5	2 3 24.6	2 3 6.7	3.22	1.79
56 10	2 5 8.6	2 4 50.6	2 4 32.7	2 4 14.7	2 3 56.7	2 3 38.8	3.25	1.80
56 20	2 5 41.4	2 5 23.3	2 5 5.3	2 4 47.3	2 4 29.2	2 4 11.2	3.28	1.80
56 30	2 6 14.5	2 5 56.4	2 5 38.3	2 5 20.2	2 5 2.0	2 4 43.9	3.32	1.81
56 40	2 6 48.0	2 6 29.8	2 6 11.6	2 5 53.4	2 5 35.2	2 5 17.0	+3.35	−1.82
56 50	2 7 21.9	2 7 3.6	2 6 45.3	2 6 27.0	2 6 8.7	2 5 50.4	3.39	1.83
57 0	2 7 56.1	2 7 37.7	2 7 19.3	2 7 1.0	2 6 42.6	2 6 24.2	3.43	1.83
57 10	2 8 30.7	2 8 12.2	2 7 53.7	2 7 35.3	2 7 16.8	2 6 58.4	3.46	1.84
57 20	2 9 5.7	2 8 47.1	2 8 28.5	2 8 10.0	2 7 51.5	2 7 32.9	3.50	1.85
57 30	2 9 41.1	2 9 22.4	2 9 3.7	2 8 45.1	2 8 26.4	2 8 7.8	+3.53	−1.86

TABLE V.

AZIMUTH OF POLARIS AT ELONGATION, 1913.

Decl. / Lat.	88° 50′ 20″	88° 50′ 30″	88° 50′ 40″	88° 50′ 50″	88° 51′ 0″	88° 51′ 10″	Variation for—	
							1′ of Lat.	1″ of δ.
° ′	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″	″
57 30	2 9 41.1	2 9 22.4	2 9 3.7	2 8 45.1	2 8 26.4	2 8 7.8	+3.53	−1.86
57 40	2 10 16.8	2 9 58.0	2 9 39.3	2 9 20.6	2 9 1.9	2 8 43.2	3.57	1.87
57 50	2 10 52.9	2 10 34.1	2 10 15.3	2 9 56.5	2 9 37.7	2 9 18.9	3.61	1.88
58 0	2 11 29.4	2 11 10.5	2 10 51.6	2 10 32.7	2 10 13.8	2 9 55.0	3.65	1.89
58 10	2 12 6.4	2 11 47.4	2 11 28.4	2 11 9.4	2 10 50.4	2 10 31.5	3.70	1.90
58 20	2 12 43.8	2 12 24.7	2 12 5.6	2 11 46.5	2 11 27.4	2 11 8.4	+3.75	−1.91
58 30	2 13 21.5	2 13 2.4	2 12 43.2	2 12 24.0	2 12 4.8	2 11 45.7	3.80	1.92
58 40	2 13 59.7	2 13 40.5	2 13 21.2	2 13 2.0	2 12 42.7	2 12 23.5	3.84	1.93
58 50	2 14 38.4	2 14 19.0	2 13 59.7	2 13 40.4	2 13 21.0	2 13 1.7	3.89	1.94
59 0	2 15 17.5	2 14 58.0	2 14 38.6	2 14 19.2	2 13 59.7	2 13 40.3	3.93	1.95
59 10	2 15 57.0	2 15 37.4	2 15 17.9	2 14 58.4	2 14 38.9	2 14 19.4	+3.98	−1.96
59 20	2 16 37.0	2 16 17.3	2 15 57.7	2 15 38.1	2 15 18.5	2 14 58.9	4.02	1.97
59 30	2 17 17.5	2 16 57.7	2 16 38.0	2 16 18.3	2 15 58.6	2 15 38.9	4.07	1.98
59 40	2 17 58.4	2 17 38.6	2 17 18.7	2 16 58.9	2 16 39.1	2 16 19.3	4.11	1.99
59 50	2 18 39.8	2 18 19.9	2 18 0.0	2 17 40.1	2 17 20.2	2 17 0.2	4.16	2.00
60 0	2 19 21.7	2 19 1.7	2 18 41.7	2 18 21.7	2 18 1.7	2 17 41.7	+4.20	−2.01

TABLE Va.

FOR REDUCING TO ELONGATION, OBSERVATIONS MADE NEAR ELONGATION, 1913.

Azimuth at Elong. / *Time.	1° 10′	1° 20′	1° 30′	1° 40′	1° 50′	2° 0′	2° 10′	2° 20′	Azimuth at Elong. / Time.*
m	″	″	″	″	″	″	″	″	m
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.2	1
2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	2
3	0.4	0.4	0.4	0.5	0.6	0.6	0.7	0.7	3
4	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	4
5	+ 1.0	+ 1.1	+ 1.3	+ 1.4	+ 1.6	+ 1.7	+ 1.9	+ 2.0	5
6	1.4	1.6	1.8	2.1	2.3	2.5	2.7	2.9	6
7	2.0	2.2	2.5	2.8	3.1	3.4	3.7	3.9	7
8	2.6	2.9	3.3	3.7	4.0	4.4	4.8	5.1	8
9	3.3	3.7	4.2	4.7	5.1	5.5	6.0	6.5	9
10	+ 4.0	+ 4.6	+ 5.1	+ 5.7	+ 6.3	+ 6.8	+ 7.4	+ 8.0	10
11	4.9	5.6	6.2	6.9	7.6	8.3	9.0	9.7	11
12	5.8	6.6	7.4	8.2	9.0	9.9	10.7	11.5	12
13	6.8	7.8	8.7	9.7	10.6	11.6	12.5	13.5	13
14	7.8	9.0	10.1	11.2	12.3	13.4	14.5	15.7	14
15	+ 9.0	+10.3	+11.6	+12.9	+14.1	+15.4	+16.7	+18.0	15
16	10.2	11.7	13.2	14.6	16.1	17.5	19.0	20.4	16
17	11.5	13.2	14.9	16.4	18.2	19.8	21.4	23.0	17
18	12.9	14.8	16.7	18.5	20.4	22.2	24.0	25.9	18
19	14.4	16.5	18.6	20.7	22.7	24.7	26.8	28.9	19
20	+16.0	+18.3	+20.6	+22.9	+25.1	+27.4	+29.7	+32.0	20
21	17.7	20.2	22.7	25.2	27.7	30.2	32.7	35.3	21
22	19.4	22.1	24.9	27.6	30.4	33.2	35.9	38.7	22
23	21.2	24.2	27.2	30.2	33.2	36.3	39.2	42.3	23
24	23.0	26.3	29.6	32.9	36.2	39.4	42.7	46.0	24
25	+25.0	+28.6	+32.1	+35.7	+39.3	+42.7	+46.3	+49.9	25
26	27.0	30.9	34.7	38.6	42.4	46.3	50.1	54.0	26
27	29.1	33.3	37.5	41.6	45.7	50.0	54.0	58.2	27
28	31.3	35.8	40.3	44.7	49.2	53.7	58.1	62.6	28
29	33.6	38.4	43.2	48.0	52.8	57.6	62.3	67.1	29
30	+35.9	+41.1	+46.2	+51.4	+56.5	+61.6	+66.7	+71.8	30

* Sidereal time from elongation.

FOR FINDING THE TIMES OF UPPER AND LOWER CULMINATION OF POLARIS FROM THE OBSERVED TIMES WHEN THE STAR IS ON THE SAME VERTICAL CIRCLE WITH THE STARS ζ URSÆ MAJORIS (MIZAR) *SUB POLO* AND δ CASSIOPEIÆ *SUB POLO*, RESPECTIVELY.

Except at high latitudes, the pole star at either upper or lower culmination furnishes a simple and convenient method for laying down a meridian line on the earth's surface at points in the northern hemisphere. When the local time is unknown and accurate astronomical instruments are not available, the time of culmination of Polaris may be found by observing the instant when Polaris is vertically above (has the same azimuth as) ζ Ursæ Majoris (Mizar) below the pole, or δ Cassiopeiæ below the pole. In the former case, for the year 1913, Polaris is approaching upper culmination and in the latter case it is approaching lower culmination. The mean time interval which elapses between the observed times above mentioned and upper or lower culmination, as the case may be, are given for ζ Ursæ Majoris and δ Cassiopeiæ for ten-day intervals in the following table. This method can not be used at places south of 30° north latitude.

TABLE VI.

MEAN TIME INTERVAL.

ζ URSÆ MAJORIS (MIZAR).
(Upper culmination of Polaris.)

1913	Lat.	40°	45°	50°	55°	60°
		m s	m s	m s	m s	m s
Jan.	1	7 18	7 17	7 15	7 13	7 10
	11	7 8	7 7	7 5	7 3	7 0
	21	6 58	6 57	6 55	6 53	6 50
July	10	7 13	7 11	7 9	7 7	7 4
	20	7 24	7 22	7 20	7 18	7 15
	30	7 34	7 33	7 31	7 29	7 26
Aug.	9	7 44	7 43	7 41	7 38	7 35
	19	7 53	7 52	7 50	7 47	7 44
	29	8 2	8 0	7 58	7 56	7 53
Sept.	8	8 10	8 8	8 6	8 3	8 0
	18	8 15	8 14	8 12	8 9	8 6
	28	8 20	8 18	8 16	8 14	8 11
Oct.	8	8 24	8 22	8 20	8 17	8 14
	18	8 25	8 24	8 22	8 19	8 16
	28	8 25	8 23	8 21	8 18	8 15
Nov.	7	8 24	8 22	8 20	8 17	8 14
	17	8 21	8 19	8 17	8 14	8 11
	27	8 15	8 14	8 12	8 9	8 6
Dec.	7	8 8	8 7	8 5	8 2	7 59
	17	8 0	7 59	7 57	7 54	7 51
	27	7 52	7 50	7 48	7 46	7 43
	37	7 42	7 41	7 39	7 37	7 34

δ CASSIOPEIÆ.
(Lower culmination of Polaris.)

1913	Lat.	35°	40°	45°	50°	55°
		m s	m s	m s	m s	m s
Jan.	1	8 22	8 23	8 25	8 27	8 29
	11	8 11	8 12	8 14	8 16	8 18
	21	8 1	8 2	8 4	8 6	8 8
	31	7 50	7 51	7 53	7 55	7 57
Feb.	10	7 40	7 41	7 42	7 44	7 46
	20	7 30	7 31	7 33	7 35	7 37
Mar.	2	7 23	7 24	7 26	7 28	7 30
	12	7 16	7 17	7 19	7 21	7 23
	22	7 12	7 13	7 14	7 16	7 18
Apr.	1	7 10	7 11	7 12	7 14	7 16
	11	7 10	7 11	7 12	7 14	7 16
	21	7 11	7 12	7 13	7 15	7 17
May	1	7 14	7 15	7 17	7 19	7 21
	11	7 20	7 21	7 23	7 24	7 26
	21	7 27	7 28	7 30	7 32	7 34
	31	7 35	7 36	7 38	7 39	7 41
June	10	7 44	7 45	7 47	7 49	7 51
	20	7 55	7 56	7 58	8 0	8 2
	30	8 5	8 6	8 8	8 10	8 13
July	10	8 16	8 17	8 19	8 21	8 23
	20	8 27	8 28	8 30	8 32	8 35
	30	8 38	8 40	8 42	8 44	8 46

ON THE ARRANGEMENT AND USE OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

The matter contained in the first 175 pages of this volume is intended primarily for the use of navigators, and consists of ephemerides of the Sun and Moon and of the planets Mercury, Venus, Mars, Jupiter, and Saturn. The remainder of the book contains ephemerides of all the planets, of their satellites, of 825 fixed stars, elements for the computation of predictions of eclipses of the Sun and Moon and of occultations of stars, tables of the pole star, Polaris, and in addition miscellaneous data for the convenience and use of astronomers, surveyors, and the general public.

TIME.

There are in general use three different kinds of time, True Solar Time—also called Apparent Solar Time—Mean Solar Time, and Sidereal Time.

True or Apparent Solar Time is measured by the diurnal motion of the Sun, the length of the day being the interval between two successive transits of the Sun over the same meridian, and the time of day being the hour-angle of the Sun westward from the meridian. Owing to the obliquity of the ecliptic and to the lack of uniformity of the motion of the Earth in its orbit, the rate of motion of the Sun in hour-angle and the length of the apparent solar day are not constant. Therefore clocks and chronometers can not be regulated to apparent solar time, which may, however, be determined by observations of the Sun when visible.

Mean Solar Time is measured by the motion of a fictitious body called the mean Sun which is supposed to move uniformly in the celestial equator, completing the circuit in one tropical year. Since mean solar time is uniform and regular in its passage, clocks and watches may be regulated to it, and those in ordinary use are usually so regulated.

Mean solar time can not, of course, be determined by direct observation, but may be determined indirectly by correcting observations of the Sun for the equation of time (page 702), or by converting to mean time sidereal time determined by observations of fixed stars (page 701).

The Mean Solar Day is the unit of mean solar time, and is equal in length to the mean or average of all the true or apparent solar days of the year. It may be otherwise defined as the interval of time elapsing between two successive transits of the mean Sun across the meridian of any place.

Sidereal Time or star time, in general terms, is measured by the diurnal motion of the fixed stars, or, speaking more precisely, by the diurnal motion of that point on the celestial equator called the vernal equinox, from which the right ascensions of the heavenly bodies are measured. Astronomical clocks regulated to sidereal time are called sidereal clocks. Sidereal time may be determined from observations of stars whose right ascensions are known.

A Sidereal Day is very nearly the length of time in which the Earth rotates on its axis and is accurately defined as the time interval between two successive transits of the vernal equinox over the same meridian. The sidereal day is shorter than the mean solar day by $3^m\ 56^s.555$ sidereal time or $3^m\ 55^s.909$ mean solar time, the tropical year of 365.2422 mean solar days containing 366.2422 sidereal days. Sidereal time and the length of the sidereal day are subject to slight irregularities on account of small differences between the positions of the true and mean equinoxes.

The mean solar and sidereal days are each divided into 24 hours. About March 23 (civil date) of each year, about two days after the vernal equinox, there is an instant when the face of a sidereal clock shows the same time as a mean time clock, and the former gains on the latter $3^m\ 56^s.555$ sidereal time per mean solar day, so that at the end of a year it will have gained one sidereal day and will again agree with the mean time clock.

The Equation of Time is the difference in hour-angle between the true Sun and the mean Sun. The true Sun is sometimes before and sometimes behind the mean Sun by an amount which varies from zero to about 16 minutes. The equation of time is given on pages I and II of each month of the Greenwich Ephemeris, and in the Solar Ephemeris for the Meridian of Washington, pages 518–525.

The Civil Day begins at midnight and comprises 24 hours, the hours being counted from 0 to 12 in two series; the first, marked A. M., running from midnight to noon, and the second, marked P. M., running from noon to midnight.

The Astronomical Day begins at noon on the civil day of the same date, the 24 hours being counted from 0 to 24, running from noon of one day to noon of the next following day. Astronomical time as well as civil time may be either apparent or mean.

The civil day begins twelve hours before the astronomical day; therefore the first half of the civil day corresponds to the last half of the preceding astronomical day, and the last half of the civil day coincides with the first half of the astronomical day of the same date. Thus, January 9, 2 o'clock, A. M., civil time, is January 8, 14^h, astronomical time; and January 9, 2 o'clock, P. M., civil time, is January 9, 2^h, astronomical time.

PRECEPTS FOR THE CONVERSION OF TIME.

To convert Sidereal Time at any place into Mean Solar Time, subtract the sidereal time of local mean noon for the beginning of the astronomical day, from the given sidereal time, and convert the interval of sidereal time thus found into mean time by means of Table II, page 686.

To convert Mean Solar Time at any place into Sidereal Time, convert the given interval of mean time (counted from mean noon) into sidereal time by means of Table III, page 689, and add the sidereal time of local mean noon for the beginning of the astronomical day.

Processes similar to the above may be employed, using the mean time of sidereal noon given on page III of the Greenwich Ephemeris instead of the sidereal time of mean noon.

To convert Apparent Solar Time into Mean Solar Time, add or subtract the equation of time as indicated on page I of the Greenwich Ephemeris, or add algebraically the equation of time taken from the Washington Solar Ephemeris, pages 518–525.

To convert Mean Solar Time into Apparent Solar Time, add or subtract the equation of time as indicated on page II of the Greenwich Ephemeris, or subtract algebraically the equation of time taken from the Washington Solar Ephemeris, pages 518–525.

To convert Civil Time into Astronomical Time.—If the civil time is marked A. M., take one from the day and add twelve to the hours; if the civil time is marked P. M., take away the designation P. M.

To convert Astronomical Time into Civil Time.—If the astronomical time is less than twelve hours, write P. M. after it; if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the days. For example, October 3, 23 hours, astronomical time, is October 4, 11 o'clock, A. M., civil time.

To convert Mean Solar or Sidereal Time of any meridian B to that of another meridian A, add the difference of longitude expressed in time when A is east of B, and subtract the difference of longitude when A is west of B.

PART I.—THE EPHEMERIS FOR THE MERIDIAN OF GREENWICH.

Pages 2–145 give data arranged under the heads of the several months, and are therefore designated as the Calendar. Each month covers 12 pages, numbered from I to XII, whose contents are as follows:

Page I contains, for Greenwich apparent noon of each day, *The Sun's Apparent Right Ascension* and *Declination,* and the *Equation of Time.* Adjoining columns contain the differences of these quantities for one hour. By multiplying any one of these differences by the hours and parts of an hour from Greenwich apparent noon, and adding the product to, or subtracting it from, the corresponding quantity at noon, according as that quantity is increasing or decreasing, we obtain the value of the quantity in question for any given Greenwich apparent time. The hourly differences are given for the instant of apparent noon at Greenwich, but when great accuracy is required they should be interpolated for half the hours and parts of an hour of the Greenwich apparent time.

The *Equation of Time* given on page I is the mean time of apparent noon, or the hour-angle of the mean Sun at that instant. The heading of the column directs how the equation is to be applied to apparent time, or the time given by an observation of the Sun, in order to get mean time. When in the course of the month there is a change from addition to subtraction or the reverse (as in the months of April and June), the two different directions are separated by a line, while a corresponding line below points out the dates between which the change occurs.

The Sun's Semidiameter and the *Sidereal Time of Semidiameter Passing Meridian* are also given on page I. The semidiameter is used in reducing the altitude of the upper or lower limb of the Sun to the altitude of the center; and in reducing the angular distance between the limb of the Sun and any other object, to the distance from the center of the Sun. The sidereal time of semidiameter passing the meridian is employed in obtaining the passage of the Sun's center over the wires of a transit instrument, when the passage of one limb only has been observed. The quantity found in this column is to be added to the time of transit of the first, or western, limb; and to be subtracted from the time of transit of the second, or eastern, limb.

This page is chiefly used when the Sun is observed on the meridian, at which instant the local apparent time is $0^h\ 0^m\ 0^s$. The longitude from Greenwich expressed in time is then the corresponding Greenwich apparent time before or after noon according as the longitude is east or west. The longitude of any place is therefore the factor employed in reducing the quantities on this page to apparent noon at that place.

The right ascension of the Sun thus reduced is the sidereal time of local apparent noon, and the difference between that and the clock time of the meridian passage of the Sun is the error of the clock on sidereal time.

The declination of the Sun reduced to the meridian, or apparent noon, of the place, is required in finding the latitude from a meridian altitude of the Sun.

As an example of the use of page I:—

Let the Sun's declination be required at apparent noon, 1913, April 15, at a place whose longitude is 89° 40′, or $5^h\ 58^m\ 40^s$ west from Greenwich:—

		h	m	s
Local apparent time . . .	April 15,	0	0	0
Longitude from Greenwich (additive) . .		5	58	40
Greenwich apparent time . . .	April 15,	5	58	40

Reducing the minutes and seconds to decimals of an hour, we find that this moment is $5^h.978$ after Greenwich apparent noon on April 15, or $18^h.022$ before Greenwich apparent noon on April 16.

On page 38 of the Ephemeris we find that the change of declination in one hour is:

	″
April 15, at Greenwich apparent noon . . .	+53.71
April 16, at Greenwich apparent noon . . .	+53.30
Difference for one day	−0.41

If great exactness is desired, we find the amount of this hourly difference for the time which is halfway between Greenwich noon and the time of observation; that is, for 3 hours after Greenwich noon of the 15th, this being half of 6 hours. Three hours is 0.125 of a day; so the calculation is as follows:

	″
Difference for one hour, April 15 . . .	+53.71
Change for 0.125 of a day or $-0''.41 \times 0.125$.	−0.05
Difference at 3 hours after noon . . .	+53.66

$53''.66 \times 5.978 = 320''.8 = 5'\ 20''.8$

		°	′	″
Declination at Greenwich noon, April 15 . .	N.	9	39	3.7
Change in 5.978 hours (additive) . . .			5	20.8
Sun's declination at time of observation . .	N.	9	44	24.5

When the time of observation is only a few hours before Greenwich noon, it may be better to count the longitude backward from this nearest noon. Thus, in the example just given the time is $18^h.022$ before Greenwich noon of April 16; half this interval is about 0.375 of a day, and the hourly motion for the middle of the interval is $53''.45$. Then, we find—

		°	′	″
Declination at Greenwich noon, April 16 . .	N.	10	0	27.9
Product of $53''.45 \times 18.022 = 963''.3$ (subtractive)	−		16	3.3
Sun's declination at time of observation . .	N.	9	44	24.6

It will always be well to make the calculation in both ways, as a check; but if the results differ slightly, the one derived from the nearest noon should be regarded as the more accurate. At sea, however, it is ordinarily sufficient to compute the declination to the nearest half minute, and the reduction may then be found by Table 12 of BOWDITCH'S *American Practical Navigator.*

Page II contains, for Greenwich mean noon of each day, *The Sun's Apparent Right Ascension* and *Declination*, the *Equation of Time*, and the *Sidereal Time of Mean Noon.* The hourly changes of these quantities are also given, and may be used in reducing them for the longitude, or to any Greenwich mean time. When great precision is required, these changes should be interpolated for half the Greenwich time, as described in explaining the calculation of the declination.

The *Equation of Time* given on page II is the apparent time of mean noon, and is equivalent to the hour-angle of the true Sun at the instant of mean noon. The heading of the column directs how the equation must be applied to mean time in order to obtain apparent time.

The *Sidereal Time of Mean Noon* is the right ascension of the mean Sun at Greenwich mean noon. It may be reduced for the longitude, or to any Greenwich mean time, by using the hourly difference, $9^{s}.8565$; or by Table III, page 689 of this volume, for reducing intervals of mean solar to sidereal time; or by Table 9 of BOWDITCH'S *Navigator.*

The right ascensions and declinations on pages I and II are affected both by aberration and nutation, and therefore denote the *apparent* positions of the *true* Sun. Page I is used for observations which depend upon apparent time, as when the Sun is observed on the meridian; while page II is used when the times have been noted by a clock or chronometer regulated to mean time, as is the case in most observations of the Sun out of the meridian.

The Sun's declination is required whenever that body is observed for the purpose of finding latitude, local time, or azimuth, and the equation of time is needed in finding the apparent time when determining the latitude from observations of the Sun out of the meridian.

The sidereal time of mean noon, or right ascension of the mean Sun, is useful in converting mean time to sidereal time. We first find the Greenwich mean time, then the right ascension of the mean Sun for that time, and this being added to the local astronomical mean time will give the sidereal time.

The sidereal time of mean noon, reduced for the longitude of the place, is also used in converting sidereal time to mean time. Subtracting the reduced value from the given sidereal time gives the interval of sidereal time from noon, and that is converted into the required mean time by subtracting from it the corresponding reduction of a sidereal interval to a mean-time interval, taken from Table II, page 686 of this volume, or from Table 8 of BOWDITCH'S *Navigator.* Instead of using Table II, this reduction may be found by multiplying $9^s.8296$ by the hours and parts of an hour of the sidereal interval from noon.

As examples of the use of page II:—

1.—Let the Sun's right ascension and the equation of time be required for 1913, July 13, $10^h\ 3^m\ 30^s$, A. M., mean time, at a place whose longitude is 85° 15′, or $5^h\ 41^m\ 0^s$ west of Greenwich.

		h	m	s
Local astronomical mean time	July 12,	22	3	30
Longitude from Greenwich (additive)		5	41	0
Greenwich mean time	July 13,	3	44	30=$3^h.7417$

Sun's Right Ascension.

	h	m	s
July 13, Greenwich noon	7	28	30.70
H. D. $10^s.159\times3.7417$	+		38.01
	7	29	8.71

Equation of Time.

	m	s
July 13, Greenwich noon	5	28.18 (subtractive)
H. D. $+0^s.302\times3.7417$.	+	1.13
	5	29.31

In this case the hourly differences interpolated to half the interval, or $1^h.87$ after noon, have been used. The equation of time is here subtractive from mean time. Its reduction could have been found by Table 12 of Bowditch's *Navigator*.

2.—If the sidereal time is required for the same time and place, we have—

	h	m	s
July 13, sidereal time (at Greenwich mean noon) . . .	7	23	2.52
Reduction for $3^h\ 44^m\ 30^s$ from Table III, or $9^s.8565\times3.7417$.	+		36.88
Add the local astronomical mean time	22	3	30.00
The required sidereal time is (rejecting 24^h)	5	27	9.40

3.—On 1913, July 13, A. M., at a place whose longitude is 85° 15′ W., suppose the sidereal time to be $5^h\ 27^m\ 9^s.40$, and that the corresponding mean time is required.

The astronomical day is July 12; the longitude in time, $+5^h\ 41^m\ 0^s$, or $+5^h.683$.

		h	m	s
July 12, sidereal time (at Greenwich mean noon) . . .		7	19	5.96
Reduction for $5^h\ 41^m\ 0^s$ from Table III, or $9^s.8565\times5.683$.		+		56.01
The sidereal time of local mean noon		7	20	1.97
The given sidereal time ($+24^h$, if necessary for the following subtraction)		29	27	9.40
Subtracting the first from the second gives the sidereal interval from noon		22	7	7.43=$22^h.1187$
Reduction for $22^h\ 7^m\ 7^s.43$ from Table II, or $-9^s.8296\times22.1187$		−	3	37.42
The required astronomical mean time is .	July 12,	22	3	30.01

Page III contains, for Greenwich mean noon of each day, *The Sun's True Longitude* and *Latitude*, and the *Logarithm of the Radius Vector of the Earth.* The longitudes of the Sun are the true geometric longitudes, not corrected for aberration. They are given in two columns, headed, respectively, λ and λ′; λ representing the Sun's longitude counted from the true equinox of the date; and λ′, the same coordinate counted from the mean equinox of the beginning of the Besselian fictitious year. The latitude is referred to the mean ecliptic of the date. Columns of hourly differences are given to facilitate finding the Sun's longitude, or the logarithm of the radius vector, for any hour from noon.

The last column on page III contains the *Mean Time of Sidereal Noon;* that is, the number of hours, minutes, and seconds after Greenwich mean noon when the vernal equinox passes the meridian of Greenwich. It may be reduced to any meridian, or to any Greenwich sidereal time, by using the hourly difference, $-9^s.8296$, to effect the necessary interpolation. The reduction, however, can be taken directly from Table II for reducing intervals of sidereal time to mean solar time, or from Table 8 of BOWDITCH's *Navigator.*

This column may be used in converting sidereal time to mean time instead of that on page II. As an illustration, let us take Example 3, above.

It is seen in advance that the sum of the mean time of sidereal noon and the given sidereal time is less than 24 hours. Were it more than 24 hours, the mean time of sidereal noon should be taken out for July 11; that is, the preceding astronomical day.

	h	m	s
July 12, the mean time of Greenwich sidereal noon is . .	16	38	10.06
Reduction for longitude from Table II, or $-9^s.8296 \times 5.683$.			−55.86
The mean time of local sidereal noon	16	37	14.20
Add the given sidereal time	5	27	9.40 $=5^h.4526$
The sum is	22	4	23.60
Reduction for $5^h\ 27^m\ 9^s.40$ from Table II, or $-9^s.8296 \times 5.4526$			−53.60
The required astronomical mean time . . July 12,	22	3	30.00

Page IV contains *The Moon's Semidiameter* and *Equatorial Horizontal Parallax* for each mean noon and midnight at Greenwich. Columns adjoining those of the horizontal parallax give the change of that quantity in one hour, by means of which it can be reduced to any other Greenwich mean time, in the same way as the Sun's declination and the equation of time in the preceding examples. The sign plus or minus is prefixed to the hourly differences, according as the horizontal parallax is increasing or decreasing.

The reduction of the Moon's semidiameter may be readily found by multiplying the reduction of the horizontal parallax by 0.2725 (see p. xi), or by simply computing the proportional part.

If, for example, the semidiameter of the Moon is to be taken out for 1913, March 10, 7^h, P. M., Greenwich mean time, we see that the difference of the semidiameters at noon and midnight of March 10 is $3''.0$; then,

$$12^h : 7^h = 3''.0 : 1''.7$$

which is the correction to be added to the semidiameter at noon, because the semidiameter is increasing. The Moon's semidiameter for March 10, 7^h, is therefore $14'\ 57''.0$.

The Moon's semidiameter and horizontal parallax are required for all observations of the Moon. When great precision is needed, the hourly differences should be interpolated for half the interval of Greenwich time from noon or midnight, and the horizontal parallax should be corrected for the latitude of the place of observation.

The mean time of *The Moon's Upper Transit* at Greenwich and the *Age of the Moon* are also contained on page IV. The time of transit is given to tenths of a minute, and is accompanied by a column of differences for one hour of longitude, by means of which the local time of the Moon's meridian transit may be computed for any other place whose longitude is known. Table 11 of Bowditch's *Navigator* furnishes the necessary reduction by simple inspection. The age of the Moon, or the time elapsed since the preceding new Moon, is given to tenths of a day.

Pages V–XII contain *The Moon's Right Ascension* and *Declination* for each day and hour of Greenwich mean time. They are accompanied by columns of differences for one minute, which are also given at each hour. The Greenwich mean time, which is required for taking out these quantities, may either be taken from a well-regulated chronometer, or may be obtained by applying the longitude, converted into time, to the local mean time of the observer. The right ascension or declination is taken out for the given day and hour of Greenwich mean time; the *Diff. for 1 Minute* is multiplied by the minutes and parts of a minute of the Greenwich time, and the product is added to or subtracted from the quantity, according as the latter is increasing or decreasing.

Thus, suppose the Moon's right ascension and declination are required for 1913, April 27, 10^h 10^m 30^s, astronomical mean time at Greenwich:—

	Right Ascension.		*Declination.*
	h m s		° ′ ″
April 27, 10^h . . .	20 26 45.44	. . . . .	S. 23 48 9.3
Diff. $2^s.1059 \times 10.5$ . .	22.11	$+8''.548 \times 10.5$	+ 1 29.8
April 27, 10^h 10^m 30^s .	20 27 7.55	. . . . .	S. 23 46 39.5

For the sake of precision, the differences here employed have been intepolated for $5^m.2 = 0^h.09$.

Page XII contains also the *Phases of the Moon* and the dates of the *Moon's Perigee and Apogee*, or least and greatest distances from the Earth.

Pages 146–177 contain the geocentric ephemerides of the seven major planets. The places given are apparent positions; that is, they are referred to the equator and true equinox of the date, and are corrected for aberration. All the data except meridian passage are given for the instant of Greenwich mean noon. The column *Meridian Passage* shows the hour, minute, and tenth of that passage of the planet over the meridian of Greenwich which occurs next after the noon of the date.

The right ascension and declination of a planet are required whenever it is observed for time, latitude, or azimuth. The mode of reducing the ephemeris positions of planets to other instants of Greenwich mean time is the same as that given for the Sun on pages 704–707. The local mean time of meridian passage of any planet, at any place, can be found by dividing the proper daily difference of the ephemeris times by 24, multiplying the quotient by the longitude of the place expressed in hours and fractions, and applying the product with its proper sign to the time of Greenwich passage.

Pages 178–199 contain the heliocentric coordinates of the seven major planets, and the logarithms of their distances from the Earth. The *Heliocentric Longitude* is reckoned, not from the true equinox, as in the preceding ephemerides, but from the mean equinox of the date. It is, therefore, necessary to apply nutation, if the longitude from the true equinox is required. The *Daily Motion* is given for the instant of Greenwich mean noon. The column *Reduction to Orbit* contains the correction to be applied to the heliocentric longitude in order to obtain the longitude counted along the orbit of the planet. The latter is equal to the distance from the mean equinox to the node, plus the distance from the node to the planet. The *Heliocentric Latitude* is counted from the mean ecliptic of the date. The

Logarithm of Radius Vector is the logarithm of the distance of the center of the planet from that of the Sun, at the Greenwich mean noon whose date is given in the first column. The last two columns give, respectively, the logarithm of the true distance of the center of the planet from that of the Earth, for the Greenwich noon indicated on the left-hand side of the page, and for the time which is midway between that date and the date next below it. In the case of Mercury, this intermediate date is mean midnight of the same day; in the case of Venus and Mars, it is the mean noon of the day immediately following; in the case of Jupiter and Saturn, it is mean noon of the second day following; and in the case of Uranus and Neptune, mean noon of the fourth day following.

Pages 200–207 contain the rectangular coordinates of the center of the Sun, referred to the center of the Earth as the origin, and to the true equator and equinox of each date as the plane and point of reference. Each coordinate is given both for Greenwich mean noon and for Greenwich mean midnight of the same day. The columns *Reduc. to Mean Eq'x of Jan. 0*, give the corrections to be applied to the coordinates for noon in order to obtain the corresponding coordinates referred to the mean equator and the mean equinox of the beginning of the Besselian fictitious year.

Pages 208–211 contain for every Greenwich mean noon and midnight the apparent geocentric longitude and latitude of the Moon referred to the true ecliptic and equinox of the date.

Page 212 contains the position of the *Moon's Equator*, the *Longitude of the Moon's Perigee*, the *Mean Longitude of the Moon's Ascending Node*, and the *Moon's Mean Longitude.*

Page 213 contains the elements of the *Moon's Libration*, and the *Sun's Aberration and Horizontal Parallax.* The formulæ for finding the libration in longitude and latitude, are given on page xii. *The Sun's Aberration* is the quantity which is to be applied to the true longitude of the Sun in order to obtain its apparent longitude. The correction being negative shows that the apparent longitude as affected by aberration is always less than the true longitude. The *Sun's Horizontal Parallax*, given in the last column, is the angle subtended by the equatorial radius of the Earth, as seen from the center of the Sun.

Pages 214, 231–232 contain data for precession and the obliquity of the ecliptic, together with all sensible terms arising from the motions of the equator and ecliptic. To show clearly the relations of these quantities, let

λ = the longitude of any body referred to the true equinox of the date.

λ' = the longitude of the same body referred to the mean equinox of the beginning of the Besselian fictitious year.

ψ_1 = the adopted value of the general precession.

$\delta'\psi$ = the principal term of the nutation in longitude; or, in other words, the correction to be applied to the longitude of a body referred to the mean equinox of date, in order to obtain that longitude as referred to the true equinox, exclusive of short period terms. When the correction is positive, the longitudes referred to the true equinox are greater than those referred to the mean equinox; while the contrary is the case when the correction has a negative sign.

$\delta''\psi$ = the short period terms of nutation in longitude, given on pages 231–232.

ω = the true or apparent obliquity of the ecliptic at the date.

ω' = the mean obliquity of the ecliptic at the beginning of the Besselian fictitious year.

$\delta'\omega$ = the principal term of the nutation of the obliquity of the ecliptic; or, in other words, the correction to be applied to the mean obliquity of date in order to find the true or apparent obliquity, exclusive of short period terms. This quantity is tabulated on page 214, and is positive or negative according as the true obliquity is greater or less than the mean obliquity.

$\delta''\omega$ = the short period terms of nutation in obliquity, given on pages 231–232.

τ = the fraction of a year intervening between the instant when the Sun's mean longitude was 280° and the date for which λ or ω is required.

Then—

$$\lambda=\lambda'+\tau\psi_1+\delta'\psi+\delta''\psi$$

$$\omega=\omega'-0''.464\ \tau+\delta'\omega+\delta''\omega$$

Page 214 contains, for each fifth Greenwich mean noon throughout the year, certain quantities which may be described in terms of the above notation as follows: The *Precession in Longitude from 1913.0* = $\tau\psi_1$; the *Nutation in Longitude* = $\delta'\psi$; the *Nutation in Right Ascension* = $(\delta'\psi)\cos\omega'$; the *Nutation in Obliquity* = $\delta'\omega$, and the *Obliquity of the Ecliptic* = $\omega-\delta''\omega$, which is the true inclination of the Earth's equator to the ecliptic, exclusive of the terms depending on the Moon's longitude.

PART II.—THE EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.

Pages 216–217 contain formulæ for reducing the positions of fixed stars, including expressions for the Besselian star-numbers and star-constants, and for the independent star-numbers; the whole based upon the constants of the Paris Conference of May, 1896, and expressed in the notation of Bessel.

Pages 218–221 contain the logarithms of the *Besselian Star-Numbers*, *A*, *B*, *C*, *D*, for each Washington mean midnight, with the values of *E* appended at the bottoms of the pages. The terms of short period have been included. These numbers serve to reduce the mean place of a star at the beginning of the Besselian fictitious year to its apparent place at the dates for which the numbers are given, and in ordinary cases four-figure logarithms suffice; but where extreme accuracy is desired the logarithms of *A*, *C*, and *D* are sometimes needed to five places of decimals. If used in accordance with the English and French notation, the pair of quantities *A* and *B* must be interchanged with the pair *C* and *D;* that is, *A* must be interchanged with *C*, and *B* with *D*. Along with the solar day, the first column contains the sidereal hour of Washington mean midnight for certain dates, and by interpolation among them it is easy to find the sidereal time for which any set of quantities is given.

The following is an example of the reduction of a star to apparent place by the Besselian star-numbers:

Computation of the apparent place of 36 Tauri for May 1, 1913, for the upper transit at Washington.

log a	0.5543	log b	8.1715	log c	8.5645	log d	8.7993
log A	9.4804	log B	0.9681n	log C	1.1530n	log D	1.1260n
log a'	1.0038	log b'	9.9366n	log c'	8.6728	log d'	9.3088
log Aa	0.0347	log Bb	9.1396n	log Cc	9.7175n	log Dd	9.9253n
log Aa'	0.4842	log Bb'	0.9047	log Cc'	9.8258n	log Dd'	0.4348n

		h m s		° ′ ″
Mean Place, 1913.0.	α_0 =	3 59 9.307	δ_0 =	+23 52 1.59
	Aa =	+1.083	Aa' =	+3.05
	Bb =	−0.138	Bb' =	+8.03
	Cc =	−0.522	Cc' =	−0.67
	Dd =	−0.842	Dd' =	−2.72
	E =	0.000	$\tau\mu'$ =	−0.01
	$\tau\mu$ =	0.000		
Apparent Place, May 1,		3 59 8.888	δ =	+23 52 9.27
	$-f'$	−0.005		
	α =	3 59 8.883		

Pages 222–229 contain the *Independent Star-Numbers*, which can frequently be advantageously used instead of the *Besselian Star-Numbers*. The terms of short period have been included. These quantities are connected with those of Bessel by the relations given on page 216, which also contains the formulæ and precepts for the application of both systems of numbers. In order to use the Besselian numbers, it is necessary to have the values of the star-constants, a, b, c, d, a', b', c', d', while the independent star-numbers render it possible to determine the apparent place of a star without computing these star-constants. Four-figure logarithms usually suffice, but where extreme accuracy is desired the logarithms of g and h are needed to five places of decimals, and G and H are needed to one-tenth of a minute of arc. The column τ gives the fraction of a year, counted from the beginning of the Besselian fictitious year to each date.

The following is an example of the reduction of a star to apparent place by the independent star-numbers:

Computation of the apparent place of 36 Tauri for May 1, 1913, for the upper transit at Washington.

	h m		° ′
G =	20 12.4	δ_0 =	+ 23 52.0
α_0 =	3 59.2	$G+\alpha_0$ =	0^h $11^m.6$
H =	15 7.1	$H+\alpha_0$ =	19 6.3

					h m s
log $\frac{1}{15}$	8.8239	log $\frac{1}{15}$	8.8239	α_0 =	3 59 9.307
log g	1.0451	log h	1.2904	f =	+ 0.924
sin $(G+\alpha_0)$	8.7041	sin $(H+\alpha_0)$	9.9816n	(g) =	+ 0.017
tan δ_0	9.6459	sec δ_0	0.0388	(h) =	− 1.364
				$\tau\mu$ =	0.000
log (g)	8.2190	log (h)	0.1347n		
				α =	3 59 8.884
					° ′ ″
log g	1.0451	log h	1.2904	δ_0 =	+ 23 52 1.59
cos $(G+\alpha_0)$	9.9994	cos $(H+\alpha_0)$	9.4553	(g') =	+ 11.08
		sin δ_0	9.6070	(h') =	+ 2.25
log (g')	1.0445			(i) =	− 5.64
		log (h')	0.3527	$\tau\mu'$ =	− 0.01
				δ =	+ 23 52 9.27
log i	0.7903n				
cos δ_0	9.9612				
log (i)	0.7515n				

Page 230 contains for every tenth sidereal day the *Besselian* and *Independent Star-Numbers*, exclusive of all short-period terms. They are useful in computing ephemerides of stars, similar to those on pages 287–486, for which constants containing short-period terms should not be employed.

Pages 231–232 contain for Washington Mean Midnight of each day the short-period terms of the nutation in longitude and obliquity, for use in connection with the formulæ on page 217, and the coefficients mentioned below, which are given for each star on pages 287–486.

Pages 233–250 contain the mean places of eight hundred and twenty-five stars, for the beginning of the Besselian fictitious year, or, in other words, for the moment when the Sun's mean longitude is 280°. The annual variations are to be considered as the differential coefficients of each coordinate with respect to the time at the beginning of the year.

Pages 251–286 contain the apparent positions of fifteen northern circumpolar stars for every upper transit at Washington. The mean solar time of transit is given in the column *Mean Solar Date*, in order that each transit above and below the pole may be readily identified. Suppose, for example, that the transit of Polaris below the pole on January 26 is to be found, and we wish to know whether it precedes or follows the upper transit of the same date. On page 251 we find that the upper transit occurs January 26.2; the lower transit, therefore, occurs January 26.7. But the lower transit following that of July 1 (page 257) does not take place until July 2.3. Hence the lower transit of July 1 precedes the upper one of the same date. A transit occurring very nearly at noon may also be identified without a computation to ascertain the actual mean date, by simply noting the tenth of a day in the column *Mean Solar Date*.

The secant and tangent of the apparent declination for the 15th of each month and the mean place in right ascension and declination for the beginning of the year are given for each star at the foot of the page.

Pages 287–486 contain, for every tenth upper transit at Washington, the apparent places of 800 stars, being all those given in the list of mean places, except the twenty-five circumpolars. The mean solar date in the left-hand column of each page gives the day and tenth of the transit, so that intermediate transits may be readily identified; and to facilitate interpolation, the differences of each coordinate are given for every ten days.

In connection with the ephemeris of each 10-day star there are given at the foot of the page, (1) the secant and the tangent of the mean of the star's greatest and least apparent declinations during the year, (2) the seconds of the mean place in both right ascension and declination for the beginning of the year, and (3) the coefficients of the short-period terms of the nutation, the use of which is explained on page 217.

Pages 487–510 contain ephemerides of ten southern circumpolar stars in all respects similar to those of northern circumpolar stars on pages 251–286.

Pages 511–517 contain the mean errors for 1920 in both right ascension and declination of the places of the 825 stars on pages 233–250 taken from *Astronomical Papers of the American Ephemeris*, Vol. VIII, Part 2, pages 370–382. They furnish data for estimating approximately the accuracy of the Mean Places of the Stars on pages 233–250.

Pages 518–525 contain the *Apparent Right Ascension* and *Declination* of the Sun, both for Washington mean and apparent noon, and the *Hourly Motion* of the Sun in these coordinates; the *Equation of Time*, the *Semidiameter* of the Sun, and the *Sidereal Time of Semidiameter Passing Meridian*, for Washington apparent noon; and, lastly, the *Sidereal Time of Mean Noon*. The hours and minutes of right ascension and the degrees and minutes of declination are always made the same for both mean and apparent noon. In cases where they really differ, the minute which would have been numerically larger is diminished by one, and the seconds increased by sixty, so that the sum of the two remains correct. The hourly motions in right ascension and declination are given for the columns headed *Mean Noon*, but may be regarded as having the same values for apparent noon.

The *Equation of Time for Apparent Noon* is the correction to be applied to apparent time in order to obtain mean time. It is, therefore, mean time minus apparent time. Each number as given is the mean time of transit of the Sun's center over the meridian of Washington, counted from the nearest noon. The use of all the quantities is substantially the same as in the *Ephemeris for the Meridian of Greenwich*.

Pages 526–541 contain the right ascension, declination, semidiameter, and parallax of the Moon at the moment of upper and lower transit over the meridian of Washington. The mean time given in the third column is that of transit of the Moon's center over this meridian. The differences for one hour of longitude are the amounts by which the local mean times of transit over a meridian one hour west of Washington would exceed those given in the column *Mean Time of Transit*, supposing the rate of change to be uniform and equal to what it is at the instant of transit over the meridian of Washington. The next four columns need no especial explanation, except that the differences for one hour of longitude are computed as if the motion of the Moon in right ascension were uniform, or, in other words, they are differential coefficients corresponding to the instants of Washington transit. By means of them, when second differences are taken into account, the position of the Moon can be computed with great exactness for the moment of transit over any meridian not more than one hour distant from Washington. To obtain the same accuracy for more distant meridians, we may proceed as follows: Let F represent either the *Mean Time of Transit*, the *Right Ascension of Center*, or the *Geocentric Declination of Center*, and let D represent the corresponding *Difference for One Hour of Longitude*. Write down three successive values of F, together with the corresponding values of D, and difference the latter as in the following scheme; where the middle values, F_0 and D_0, belong to the culmination from which is to be derived the value of F for the culmination on the meridian whose longitude is λ:—

Function.	Diff. for 1 Hour of Longitude.	Δ'	Δ''
F_{-1}	D_{-1}		
		a'	
F_0	D_0		b
		a''	
F_{+1}	D_{+1}		

Then, for the culmination at the meridian λ

$$F_\lambda = F_0 + \lambda D_0 + \frac{\lambda^2}{48}(a' + a'') + \frac{\lambda^3 b}{864}$$

where λ must be expressed in hours and decimals of an hour, and reckoned from Washington or from 180° from Washington according as the upper or lower culmination is used for the middle value (F_0). Adding twelve hours to the Washington time of lower transit at Washington gives the local time of upper transit at places whose longitude is 180° from Washington.

The columns of *Sidereal Time of Semidiameter Passing Meridian*, *Geocentric Semidiameter* and *Equatorial Horizontal Parallax* need no explanation, except that they are all given for the moment of transit. The column *Bright Limbs* is given to indicate to the observer which limbs are illuminated. When one limb is full and the terminator is within 1″ of the opposite limb, both can be well observed, and in such cases both are indicated, the defective limb being indicated by an italic letter or numeral.

Pages 542–558 contain for each of the seven major planets, the geocentric *Apparent Right Ascension* and *Declination*, the *Horizontal Parallax*, *Semidiameter*, and *Sidereal Time of Semidiameter Passing Meridian*, for the moments of all transits which it is usually desirable to observe over the meridian of Washington. The columns following the dates give the Washington mean times of these transits. The stellar magnitude at opposition for Mars, Jupiter, Saturn, Uranus, and Neptune, respectively, is given at the bottom of the page containing the ephemeris of the planet.

PART III.—PHENOMENA.

This part gives the dates of the principal astronomical phenomena of the year, expressed in Washington mean time, except in the case of the eclipses, which are expressed in Greenwich mean time.

Pages 560–565 contain all necessary data respecting the solar and lunar eclipses which occur during the year.

The eclipse elements are given for the moment of conjunction of the Sun and Moon in right ascension, but the subsequent tables and results are computed from the exact positions of these bodies at the several instants referred to. The times and angles designated as the circumstances of a lunar eclipse remain the same throughout all parts of the Earth, and require no explanation beyond a mere statement of the fact that in computing them the geometrical diameter of the Earth's shadow has been augmented in the proportion of 51 : 50. The principal circumstances of each total and annular eclipse are stated in five lines, as follows:—

The line entitled "Eclipse begins" gives the Greenwich mean time at which the Moon's penumbra first touches the Earth, together with the latitude and longitude of the point of contact.

The line entitled "Central eclipse begins" gives the time when the axis of the Moon's shadow first touches the Earth, and the latitude and longitude of the point of contact follow.

The line entitled "Central eclipse at noon" gives the time when the axes of the Earth and of the shadow cone lie in the same plane. The latitude and longitude of the point where the axis of the shadow cone then cuts the Earth's surface follow, and there the eclipse will be central and the Sun will be exactly on the meridian.

The lines entitled "Central eclipse ends" and "Eclipse ends" give, respectively, the times when and the localities where these events occur, the phenomena being the converse of those denoted by the similar phrases for the beginning.

In the case of partial solar eclipses the axis of the Moon's shadow does not come into contact with the Earth, and the three lines entitled, respectively, "Central eclipse begins," "Central eclipse at noon," and "Central eclipse ends," are replaced by a single line entitled "Greatest eclipse," whereon are given the time when and the latitude and longitude where the eclipse attains its greatest magnitude. The latter phenomenon necessarily occurs with the Sun in the horizon.

Maps of the Eclipses.—The regions in which each eclipse is visible are shown upon the map relating to it, from which may be taken approximately, for any place, both the times of the beginning and ending of the eclipse and its magnitude. The dotted curves show the outline of the shadow for each hour of Greenwich mean time, and therefore pass through all places where the eclipse begins or ends at the hour indicated. To find the instant of beginning at any place, we determine by inspection between what pair of these curved lines the place is situated. The eclipse will then begin between the corresponding hours of Greenwich mean time; and the fraction of the hour may be determined by dividing the hour in the same proportion as the space representing it on the map is divided by the place in question. This division may be made a little more exact by allowing for the changes in the spaces as indicated by their varying width. The Greenwich mean time thus found must be reduced to local mean time by applying the longitude.

As an example, suppose we wish to find the times at which the eclipse of 1913, April 6, begins and ends near Sitka, Alaska, latitude 57° 0′ N., longitude 135° 8′ W.

For the beginning we compare the distance of the place from the curves of 4^h and 5^h, and find it to correspond to about 40 minutes from the former, thus giving for the approximate time of beginning $4^h\ 40^m$; for the end we compare the distance of the place from the curves of 6^h and 7^h, and find it to be about 20 minutes from the former, thus giving for the approximate time of ending $6^h\ 20^m$, and both of these results are probably correct to within 3 or 4 minutes.

Changing to local mean time, we shall have—

		Beginning.			Ending.		
		d	h	m	d	h	m
Greenwich mean time	April	6	4	40	6	6	20
Longitude west			9	1		9	1
Local mean time	April	5	19	39	5	21	19

In the case of total and annular eclipses, a fair estimate of the magnitude of the eclipse at any place may be obtained from the position thereof relatively to the central line and to the limit. On the central line the eclipse is annular or total, while between the central line and the limit the maximum magnitude of the eclipse is given by the quotient of the distance of the place from the limit divided by the distance of the central line from the limit; the measurements being made upon a line drawn through the place, perpendicularly to the central line.

More Accurate Computations.—A more accurate determination of the phases, as visible at any point of the Earth's surface, may be obtained from the Besselian elements which are given for every 10 minutes of Greenwich mean time. Their geometric signification is as follows:—

Let us imagine a plane passing through the center of the Earth, perpendicular to the right line joining the centers of the Sun and Moon. This latter line is the axis of the Moon's shadow, and the plane is called the *fundamental plane* or plane of xy. We take the intersection of this plane with that of the Earth's equator as the axis of x, and the center of the Earth as the origin of coordinates. The axis of y is perpendicular to that of x, and directed toward the north; x and y are then the coordinates of the point in which the axis of the shadow intersects the fundamental plane, and they are here expressed in terms of the Earth's equatorial radius as unity. The angle d, of which the sine and cosine are both given, is the declination of that point of the celestial sphere toward which the axis of the shadow is directed; or, in other words, it is the declination of the center of the Sun as seen from the center of the Moon. The angle μ is the Greenwich hour-angle of this same point of the celestial sphere.

The quantities l_1 and l_2 are the radii of the shadow cones upon the fundamental plane, l_1 corresponding to the penumbra, and l_2 to the umbra, or annulus. The notation is that of CHAUVENET'S *Spherical and Practical Astronomy*, in which l_2 is regarded as positive for an annular and negative for a total eclipse.

The angles f_1 and f_2, the tangents of which are given, are the angles which the elements of the respective shadow cones make with the axis of the shadow; or, they are the semiangles of the two cones.

In order to facilitate interpolation to any required moment, the logarithms of x', y', and μ', which are the changes of x, y, and μ, in one minute of time, are given at the bottom of the table.

The method of computing an eclipse from its Besselian elements is based on the fact that at the moments of beginning and ending the distance of the observer from the axis of the shadow or penumbra is equal to the radius of the latter at the point of observation. To find this distance and radius we proceed as follows:—

(1) The coordinates of the observer, ξ, η, and ζ, together with their variations in one minute, are computed for some assumed moment of Greenwich mean time, as near as practicable to the true time of the required phase.

(2) The coordinates x and y of the axis of the shadow, together with their variations in one minute, are taken for the same moment from the tables of elements.

(3) From (1) and (2) the position and motion of the observer relative to the axis of the shadow are found.

(4) The radius of the penumbra or umbra at a distance from the fundamental plane equal to that of the observer is also computed.

(5) Then, assuming the motions to be uniform, we determine the time required for the observer to be brought to a distance from the axis of the shadow equal to this radius.

The formulæ and directions for the several steps in the computation are as follows:—

(1) Find $\rho \cos \varphi'$ and $\rho \sin \varphi'$, which are the geocentric coordinates of the station referred to the Earth's equator, ρ being the distance from the center of the Earth and φ' the geocentric latitude. These coordinates may be obtained from geodetic tables, or may be computed from the following table based on CLARKE'S spheroid of 1866, by the formulæ—

$$\rho \cos \varphi' = F \cos \varphi$$

$$\rho \sin \varphi' = \frac{\sin \varphi}{G}$$

φ being, as usual, the geographic latitude.

Table for Computing the Geocentric Coordinates of a Place.

φ	Log F.		Log G.	
0°	0.00000		0.00295	
5	0.00001	1	0.00294	1
10	0.00004	3	0.00291	3
15	0.00010	6	0.00285	6
20	0.00017	7	0.00278	7
25	0.00026	9	0.00269	9
30	0.00037	11	0.00258	11
35	0.00048	11	0.00247	11
40	0.00061	13	0.00234	13
45	0.00074	13	0.00221	13
50	0.00086	12	0.00209	12
55	0.00099	13	0.00196	13
60	0.00111	12	0.00184	12
65	0.00121	10	0.00174	10
70	0.00130	9	0.00165	9
75	0.00138	8	0.00157	8
80	0.00143	5	0.00152	5
85	0.00146	3	0.00149	3
90	0.00147	1	0.00147	2

For the assumed Greenwich mean time of computation, take from the table of elements the values of sin d, cos d, and μ. Then, with λ for the longitude west from Greenwich, the coordinates of the observer will be—

$$\xi = \rho \cos \varphi' \sin (\mu - \lambda)$$
$$\eta = \rho \sin \varphi' \cos d - \rho \cos \varphi' \sin d \cos (\mu - \lambda) = \eta_1 - \eta_2$$
$$\zeta = \rho \sin \varphi' \sin d + \rho \cos \varphi' \cos d \cos (\mu - \lambda) = \zeta_1 + \zeta_2$$

and their variations in one minute of mean time will be—

$$\xi' = [7.63992]\, \rho \cos \varphi' \cos (\mu - \lambda)$$
$$\eta' = [7.63992]\, \rho \cos \varphi' \sin d \sin (\mu - \lambda) = [7.63992]\, \xi \sin d$$

ζ' is not needed.

(2) For the same assumed moment of Greenwich mean time, take from the tables of elements the coordinates x and y of the axis of the shadow, together with their variations for one minute, which are equal to one-tenth of the differences of two consecutive numbers. These variations are represented by x' and y', and their logarithms are given beneath the tables of x and y.

(3) The distance m and position-angle M of the axis of the shadow relatively to the observer, and the relative motions, n and N, are computed by the formulæ—

$$m \sin M = x - \xi$$
$$m \cos M = y - \eta$$
$$n \sin N = x' - \xi'$$
$$n \cos N = y' - \eta'$$

(4) Both for the shadow and for the penumbra, the radius L at the distance ζ from the fundamental plane is computed by the formula—

$$L = l - \zeta \tan f$$

l and f being found from the table of elements, and ζ computed in (1).

(5) If the time chosen for computation is exactly that of the beginning or ending of the eclipse, we shall have—

$$m = L$$

But, as this condition will rarely be fulfilled on a first trial, a correction τ to the assumed time is computed thus: Find the angle ψ from the equation,

$$\sin\psi = \frac{m \sin (M-N)}{L}$$

There will be two values for this angle, of which one will be in the first and the other in the second quadrant when sin ψ is positive, and one in the third and the other in the fourth quadrant when sin ψ is negative; but simplicity will be gained by taking only that value of ψ for which cos ψ is positive. This value lies between the limits $+90°$ and $-90°$. The correction τ to the assumed time of beginning or ending of the eclipse will then be found, in minutes, from—

$$\tau = -\frac{m \cos (M-N)}{n} \mp \frac{L \cos \psi}{n}$$

where the double sign is to be taken negative for the beginning and positive for the ending.

However, one such pair of values of τ can not give the times of both beginning and ending with accuracy. To attain that, we must commence the computation by assuming two times, one near the beginning and the other near the ending of the eclipse, both of which may be derived from the chart with sufficient exactness. The computation for the first assumed time will give a small value of τ which, when applied to the assumed time, will give the beginning of the eclipse nearly correctly, and a large value which will give an inaccurate time of ending. Similarly the computation for the second assumed time will give a small and nearly correct value of τ for finding the time of ending, and a large and inaccurate negative value for finding the time of beginning. We shall thus deduce two times of each phase, only one of which is to be regarded as approximately correct.

The more accurate times of beginning and ending may now be taken in place of those originally assumed, and the whole computation may be repeated, thus leading to a pair of values of τ, which should be very small and accurate. Such a repetition of the computation will in general be advisable, to guard against accidental numerical errors, but a second approximation may be obtained without it, by finding a corrected value of τ in accordance with the formulæ—

$$\delta\tau = \mp \frac{\tau(l' + [5.3100]\xi \cos d)}{n \cos \psi} - \frac{[4.9788]\tau^2}{n \cos \psi}[\xi \sin (N \mp \psi) - \eta_2 \cos (N \mp \psi)]$$

$$\tau_0 = \tau + \delta\tau \quad .$$

where the double signs are to be taken negative for the beginning of the eclipse and positive for the ending. l' is the variation of l for one minute of time, and its numerical value can be taken by inspection from the table of Besselian elements.

If the resulting values of τ_0 are not greater than fifteen minutes, the corrected times of contact thus obtained will be theoretically exact within less than a second, but the uncertainties of the solar and lunar tables are such that an unavoidable error of several seconds may exist in the prediction. To guard against numerical mistakes it is better, after making this final correction, to repeat the computations so far as to obtain new values of m and L for the corrected times. If these two quantities agree within a unit of the fourth place of decimals, the times employed are generally correct within a second of time. If they differ too widely, the computer must use his own judgment as to making further corrections and computations.

Position-angle of Point of Contact.—The position-angle P, of the point of contact, reckoned from the north point of the Sun's limb toward the east, is found by the formulæ—

$$P = N - \psi \pm 180^\circ \text{ for the beginning,}$$
$$\text{or} \quad P = N + \psi \quad \text{for the ending,}$$

it being assumed that, in each case, the value of ψ is taken between the limits ± 90°.

Computation of the Solar Eclipse of 1913, April 6, for a point at Sitka, Alaska.

The position of the point chosen is—

	°	′	″
Latitude, $\varphi = +$	57	0	0
Longitude, $\lambda = +$	135	8	0

and its geocentric coordinates are—

$$\rho \sin \varphi' = 9.92168$$
$$\rho \cos \varphi' = 9.73715$$

From the Eclipse Chart we find the approximate times of the phases to be—

	d	h	m	
Beginning April	6	4	40	Greenwich Mean Time.
Ending	6	6	20	

	Beginning.	Ending.
Greenwich Mean Time, T, April 6,	$4^h\ 40^m$	$6^h\ 20^m$
	° ′ ″	° ′ ″
μ	69 21 48	94 22 12
λ	+135 8 0	+135 8 0
$\mu - \lambda$	− 65 46 12	− 40 45 48
$\rho \cos \varphi'$	9.73715	9.73715
$\sin (\mu - \lambda)$	9.95995 *n*	9.81487 *n*
$\log \xi$	9.69710 *n*	9.55202 *n*
ξ	−0.49786	−0.35647
$\rho \sin \varphi'$	9.92168	9.92168
$\cos d$	9.99728	9.99726
$\log \eta_1$	9.91896	9.91894
η_1	+0.82978	+0.82974
$\rho \cos \varphi'$	9.73715	9.73715
$\sin d$	9.04724	9.04894
$\cos (\mu - \lambda)$	9.61320	9.87933
$\log \eta_2$	8.39759	8.66542
η_2	+0.02498	+0.04628
$\eta = \eta_1 - \eta_2$	+0.80480	+0.78346
$\rho \sin \varphi' \sin d$	8.96892	8.97062
ζ_1	+0.09309	+0.09346
$\rho \cos \varphi' \cos d \cos (\mu - \lambda)$	9.34763	9.61374
ζ_2	+0.22265	+0.41090
$\zeta = \zeta_1 + \zeta_2$	+0.31574	+0.50436
const. log	7.63992	7.63992
$\rho \cos \varphi' \cos (\mu - \lambda)$	9.35035	9.61648
$\log \xi'$	6.99027	7.25640

	Beginning.	**Ending.**
ξ'	+0.000978	+0.001805
const. log	7.63992	7.63992
$\xi \sin d$	8.74434 *n*	8.60096 *n*
$\log \eta'$	6.38426 *n*	6.24088 *n*
η'	−0.000242	−0.000174
$x-\xi$	−0.52217	+0.09217
$y-\eta$	+0.14046	+0.56620
$x'-\xi'$	+0.006578	+0.005753
$y'-\eta'$	+0.004288	+0.004216
$m \sin M$	9.71781 *n*	8.96459
$m \cos M$	9.14755	9.75297
$\tan M$	0.57026 *n*	9.21162
M	−74° 56′ 40″	+9° 14′ 45″
$\sin M$	9.98483 *n*	9.20593
$\log m$	9.73298	9.75866
$n \sin N$	7.81809	7.75989
$n \cos N$	7.63225	7.62490
$\tan N$	0.18584	0.13499
N	+56° 54′ 4″	+53° 45′ 53″
$\sin N$	9.92310	9.90666
$\log n$	7.89499	7.85323
$\tan f$	7.66941	7.66940
$\log \zeta$	9.49933	9.70274
	7.16874	7.37214
$\zeta \tan f$	+0.00147	+0.00236
l	+0.56512	+0.56498
L	+0.56365	+0.56262
$M-N$	+228° 9′ 16″	−44° 31′ 8″
$\sin (M-N)$	9.87212 *n*	9.84581 *n*
$\log m$	9.73298	9.75866
colog L	0.24899	0.24978
$\sin \psi$	9.85409 *n*	9.85425 *n*
ψ	−45° 36′ 50″	−45° 38′ 9″
$\log \frac{m}{n}$	1.83799	1.90543
$\cos (M-N)$	9.82421 *n*	9.85310
	1.66220 *n*	1.75853
$-\frac{m}{n} \cos (M-N)$	+45.941	−57.350
$\log L$	9.75101	9.75022
$\cos \psi$	9.84478	9.84461
colog n	2.10501	2.14677
	1.70080	1.74160

	Beginning.	Ending.
$\mp \frac{L \cos \psi}{n}$	-50.211	$+55.157$
	m	m
τ	$-$ 4.270	$-$ 2.193
	d h m	d h m
$T+\tau$	6 4 35.730	6 6 17.807

Since the value of τ for the beginning is rather large, we compute the correction $\delta\tau$ for this phase as follows:

	Beginning.
const. log	5.3100
log ξ	9.6971 *n*
cos d	9.9973
	5.0044 *n*
number	-0.0000101
l'	-0.0000010
sum	-0.0000111
log (sum)	5.0453 *n*
log $(-\tau)$	0.6304
colog n	2.1050
sec ψ	0.1552
	7.9359 *n*
(1)	-0.0086
$N-\psi$	102° 31′
sin $(N-\psi)$	9.9896
log ξ	9.6971 *n*
log ξ sin $(N-\psi)$	9.6867 *n*

	Beginning.
cos $(N-\psi)$	9.3359 *n*
log η_2	8.3976
log η_2 cos $(N-\psi)$	7.7335 *n*
ξ sin $(N-\psi)$	-0.4861
η_2 cos $(N-\psi)$	-0.0054
diff.	-0.4807
log (diff.)	9.6819 *n*
const. log	4.9788 *n*
log τ^2	1.2608
colog $(n \cos \psi)$	2.2602
	8.1817
(2)	$+0.0152$
	m
$(1)+(2)=\delta\tau$	$+0.0066$
τ	-4.270
τ_0	-4.263

The corrected time of beginning is, therefore,

$$T_0 = \text{April } 6^d\ 4^h\ 35^m.737$$

Whence we find—

		Beginning.	Ending.
		d h m	d h m
Greenwich Mean Time,	April	6 4 35.737	6 6 17.807
λ		+ 9 0.533	+ 9 0.533
Local Mean Time,	April	5 19 35.204	5 21 17.274

Therefore we have—

		d h m s	
Beginning of the Eclipse,	April	5 19 35 12.2	Local Mean Time.
End of the Eclipse,	April	5 21 17 16.4	

	Beginning.	Ending.
	° ′	° ′
$N \mp \psi$	102 30.9	8 7.7
constant	180 0.0	0 0.0
Angle of position: P	282 30.9	8 7.7

from the north point of the Sun's disk toward the east for direct image.

Pages 566–569 contain the adopted mean places and annual proper motions of such stars as bright as magnitude 6.5 as will be occulted during the year by the Moon.

Pages 570–604 contain the elements for the prediction of the times of occultations of stars and planets by the Moon during the current year. The system of coordinates employed is similar to that already described for eclipses, the fundamental plane passing through the center of the Earth, and being taken perpendicular to the line joining the star and the center of the Moon, but the cone circumscribing the Moon and star is regarded as a cylinder which intercepts the fundamental plane in a circle having the same linear diameter as the Moon.

In the columns referring to the star, those headed *Red'ns from 1913.0* give the quantities necessary to reduce the mean place of the star at the beginning of 1913 to its apparent place at the time of occultation. These reductions are sufficiently accurate to be definitive.

Under the general head, *At Conjunction in R. A.*, are five columns giving certain quantities for the moment of geocentric conjunction of the Moon and star in right ascension, as follows:

The *Washington Mean Time* is the moment, T, at which the two bodies are in geocentric conjunction in right ascension. At that moment the coördinate x of the axis of the cylinder on the fundamental plane has the value zero. The column *Hour Angle, H*, gives the common geocentric hour-angle of the Moon and star at the same moment, expressed in sidereal time and counted from the meridian of Washington—positive toward the west and negative toward the east. Column Y gives the coordinate y of the axis of the cylinder upon the fundamental plane at the same moment. Columns x' and y' give the variations of x and y in one hour of mean time. The linear unit in these columns is the Earth's equatorial radius. The limiting parallels, north and south, show the extreme limits of latitude within which the occultation will be visible.

By the aid of these elements, the Washington mean time of immersion and emersion of a star relatively to the limb of the Moon may be computed for any part of the Earth by a method nearly the same as that already explained for computing eclipses, but somewhat more simple.

Prediction of Occultations for a given Place.—When it is desired to predict the circumstances of one or more occultations at any place, the first step will be to select them from the general list given in the Ephemeris. The conditions of visibility are:—

1. The limiting parallels in the last columns must include the latitude of the place.

2. The quantity $H-\lambda$, taken without regard to sign, must be less than the semidiurnal arc of the star by at least one hour. On very rare occasions an emersion might be seen in the east, or an immersion in the west, when this difference is a few minutes less than an hour.

3. The Sun must not be much more than an hour above the horizon at the local mean time $T-\lambda$, unless the star is bright enough to be seen in the daytime.

When many occultations are to be selected, the most convenient course will be to write the value of $-\lambda$ on the bottom of a slip of paper, and in passing through the list of occultations, to pause over each one for which condition (1) is fulfilled, and examine by means of the slip whether conditions (2) and (3) are also fulfilled. If either fails, the computer passes on. Sometimes it will be difficult to determine whether $H-\lambda$ or $T-\lambda$ falls within the limits; and in such cases the computer may mark the occultation for trial and leave the decision for the subsequent operations. The whole list can be gone over in less than a day, and it will probably be found that about one-tenth of the occultations are marked for trial.

The next step will be to compute the local times of immersion and emersion from the elements, and to that end let—

T = the instant of geocentric conjunction of Moon and star in right ascension, expressed in Washington mean solar time;
H = the Washington west hour-angle of the two bodies at that moment;
λ = the longitude west of Washington;
$h_0 = H - \lambda$ = the local hour-angle of the star at the instant T;
δ = the star's declination.

The procedure for each occultation will then be as follows:—

(1) The geocentric coordinates of the place, $\rho \sin \varphi'$ and $\rho \cos \varphi'$, are to be computed by the formulæ and table given in connection with eclipses on page 716.

The next step will be to find the approximate instant of apparent conjunction of the Moon and star as seen from the place, and that may be deduced from the time of geocentric conjunction by the application of an approximate correction taken from Mr. DOWNES's table, printed in the volumes of the American Ephemeris for 1882 to 1899. This correction must be reckoned in mean solar hours, and will be designated by the symbol t. It will have the same sign as h_0.

When DOWNES's table is not available, the correction may be computed from the formulæ,

$$\xi_0 = \rho \cos \varphi' \sin h_0$$
$$\xi' = [9.4192]\, \rho \cos \varphi' \cos \frac{4}{3} h_0$$
$$t = \frac{\xi_0}{x' - \xi'}$$

By applying t to the Washington mean time of geocentric conjunction, as given with the elements, we shall have the Washington mean time of local conjunction within a few minutes.

(2) Compute for the instant $T+t$ the following quantities, in which t_0 is the sidereal equivalent of the mean time interval t:

$$\begin{aligned}
\xi &= \rho \cos \varphi' \sin (h_0 + t_0) \\
\eta &= \rho \sin \varphi' \cos \delta - \rho \cos \varphi' \sin \delta \cos (h_0 + t_0) = \eta_1 - \eta_2 \\
\xi' &= [9.4192]\, \rho \cos \varphi' \cos (h_0 + t_0) \\
\eta' &= [9.4192]\, \rho \cos \varphi' \sin \delta \sin (h_0 + t_0) = [9.4192]\, \xi \sin \delta \\
x &= x't \\
y &= Y + y't
\end{aligned}$$

Compute also m, M, n, N, and ψ from the equations,

$$\begin{aligned}
m \sin M &= x - \xi \\
m \cos M &= y - \eta \\
n \sin N &= x' - \xi' \\
n \cos N &= y' - \eta' \\
\sin \psi &= [0.5646]\, m \sin (M - N)
\end{aligned}$$

ψ being taken between the limits ±90°. Finally compute,

$$\tau = -\frac{[1.7782]m}{n}\cos(M-N) \mp \frac{[1.2135]}{n}\cos\psi$$

$$\delta\tau = \frac{[6.7591]\tau^2}{n\cos\psi}[\eta_2\cos(N\mp\psi) - \xi\sin(N\mp\psi)]$$

where the double signs are to be taken negative for an immersion and positive for an emersion. Both τ and $\delta\tau$ thus have two values, which are expressed in minutes of time, and in order to distinguish them let those pertaining to immersion be designated respectively τ' and $\delta\tau'$, while those pertaining to emersion are designated τ'' and $\delta\tau''$. We then have for the Washington mean times of the phases,

$$\text{Instant of immersion} = T + t + \tau' + \delta\tau'$$
$$\text{Instant of emersion} \quad = T + t + \tau'' + \delta\tau''$$

These expressions are practically exact, as the corrections $\delta\tau$ seldom amount to so much as 1.5 minutes, and whenever an inaccuracy of that magnitude is permissible they may be omitted. As a check upon the results, it will be advisable to compute ξ, η, x, and y for the times of immersion and emersion finally obtained. If these times are correct the quantities in question will fulfill the condition,

$$\sqrt{(x-\xi)^2 + (y-\eta)^2} = 0.2725$$

If log m sin $(M-N) > 9.4354$, sin ψ will be numerically greater than unity, and no occultation is to be expected at the given place; but a very brief one may occur if the excess of the computed distance over the Moon's semidiameter happens to be within the errors of the ephemerides of the Moon and star.

The position-angle of the line from the Moon's center to the star, at the time of contact, is reckoned from the north point toward the east, and designated by the symbol P. It is computed from the formulæ,

$$P = N - \psi + \delta P \qquad \text{for immersion,}$$
$$\text{or} \qquad P = N + \psi + \delta P \pm 180^\circ \text{ for emersion,}$$

where the angles $N-\psi$ and $N+\psi$ are taken directly from the computation of $\delta\tau$, and δP is found in degrees of arc from the expression,

$$\delta P = \mp\frac{[7.3038]\tau^2}{\cos\psi}[\eta_2\sin N + \xi\cos N]$$

In the latter formula the double sign is to be taken negative for an immersion and positive for an emersion.

The angle from the vertex, V, is also reckoned in the direction from the north toward the east, and is found from the formula,

$$V = P - C$$

where C is computed from the expression,

$$\tan C = \frac{\xi + [8.2218]\tau\xi' - [4.9810]\tau^2\xi}{\eta + [8.2218]\tau\eta' + [4.9810]\tau^2\eta_2}$$

C being taken less or greater than 180°, according as the numerator is positive or negative.

The value of τ employed in the latter formula must be so taken as to correspond with the phase for which C is required.

In the volumes of the American Ephemeris for the years 1882 to 1901 instructions are given for constructing three special tables which greatly diminish the labor of computing occultations, but as these tables should contain from 4700 to 6300 quantities, and as they would apply only to the place for which they were computed, it will rarely be worth while to undertake the labor of forming them. Those who desire further information on the subject may consult any one of the volumes in question.

As an example of an isolated occultation, we will compute that of η Tauri (*Alcyone*) on December 11, 1913, for Baltimore, whose position is—

$$\varphi = +39^\circ\ 17'\ 48''$$
$$\lambda = -\ 0^h\ 1^m\ 49^s.8$$

and whose geocentric coordinates are—

$$\rho \sin \varphi' = 9.7993$$
$$\rho \cos \varphi' = 9.8893$$

From the elements on page 602 we have,

$$T = 5^h\ 1^m.7$$
$$H = -5^h\ 20^m.7$$

and $h_0 = H - \lambda = -5^h\ 18^m.9$

From the formulæ on page 723, we find the correction, t, to the Washington mean time of geocentric conjunction, T, to be about $-1^h\ 15^m.5$; therefore the Washington mean time of apparent conjunction is—

$$T + t = \text{December } 11^d\ 3^h\ 46^m.2.$$

η Tauri (*Alcyone*).	Apparent Declination. ° ′ +23 50.6	W. T. of ☌ d h m Dec. 11 5 1.7	Hour Angle. h m −5 20.7	Y +0.7012	x' 0.5489	y' +0.1451

$T+t$ Dec. 11^d	$3^h\ 46^m.2$
h_0	$-5\ \ 18.9$
t_0	$-1\ \ 15.7$
h_0+t_0	$-6\ \ 34.6$
$\rho \cos \varphi'$	9.8893
$\sin (h_0+t_0)$	9.9950 *n*
$\log \xi$	9.8843 *n*
ξ	−0.7661
$\rho \sin \varphi'$	9.7993
$\cos \delta$	9.9612
$\log \eta_1$	9.7605
η_1	+0.5761
$\rho \cos \varphi'$	9.8893
$\sin \delta$	9.6066
$\cos (h_0+t_0)$	9.1772 *n*
$\log \eta_2$	8.6731 *n*

η_2	−0.0471
$\eta_1 - \eta_2 = \eta$	+0.6232
const. log	9.4192
$\rho \cos \varphi' \cos (h_0+t_0)$	9.0665 *n*
$\log \xi'$	8.4857 *n*
ξ'	−0.0306
const. log	9.4192
$\xi \sin \delta$	9.4909 *n*
$\log \eta'$	8.9101 *n*
η'	−0.0813
$\log x'$	9.7395
$\log t$	0.0998 *n*
$\log x$	9.8393 *n*
x	−0.6907
$\log y'$	9.1617
$\log y't$	9.2615 *n*

$T+t$ Dec. 11^{d}	$3^{h}\ 46^{m}.2$
$y't$	−0.1826
Y	+0.7012
y	+0.5186
$x-\xi$	+0.0754
$y-\eta$	−0.1046
$x'-\xi'$	+0.5795
$y'-\eta'$	+0.2264
$m \sin M$	8.8774
$m \cos M$	9.0195 *n*
$\tan M$	9.8579 *n*
M	+144° 13′
$\cos M$	9.9091 *n*
$\log m$	9.1104
$n \sin N$	9.7631
$n \cos N$	9.3549
$\tan N$	0.4082
N	+68° 40′
$\sin N$	9.9692
$\log n$	9.7939

const. log	0.5646
$\log m$	9.1104
$\sin (M-N)$	9.9860
$\sin \psi$	9.6610
ψ	+27° 16′
const. log	1.7782
$\log \frac{m}{n}$	9.3165
$\cos (M-N)$	9.3971
	0.4918
$-\frac{[1.7782]m}{n}\cos (M-N)$	− 3.10
const. log	1.2135
colog n	0.2061
$\cos \psi$	9.9488
	1.3684
$\mp\frac{[1.2135]\cos \psi}{n}$	∓23.36
	m
τ for immersion	−26.46
τ for emersion	+20.26

The computation of $\delta\tau$ for the two contacts is as follows:

	Immersion.	Emersion.
$N \mp \psi$	41° 24′	95° 56′
$\cos (N \mp \psi)$	9.8751	9.0144 *n*
$\log \eta_2$	8.6731 *n*	8.6731 *n*
$\log (1)$	8.5482 *n*	7.6875
(1)	−0.0353	+0.0049
$\sin (N \mp \psi)$	9.8204	9.9977
$\log \xi$	9.8843 *n*	9.8843 *n*
$\log (2)$	9.7047 *n*	9.8820 *n*
(2)	−0.5066	−0.7621
$(1)-(2)$	+0.4713	+0.7670
$\log [(1)-(2)]$	9.6733	9.8848
const. log	6.7591	6.7591
$\log \tau^2$	2.8452	2.6133
colog $(n \cos \psi)$	0.2573	0.2573
$\log \delta\tau$	9.5349	9.5145
	m	m
$\delta\tau$	+ 0.34	+ 0.33
$\tau+\delta\tau$	− 26.12	+ 20.59

		d	h	m	h	m
$T+t$	Dec.	11	3	46.2	3	46.2
Washington Mean Time of Phase,	"	11	3	20.1	4	6.8
λ			−0	1.8	−0	1.8
Baltimore Mean Time,	Dec.	11	3	18.3	4	5.0

To find δP and P:

log η_2	8.6731 *n*	log ξ	9.8843 *n*	(3)	−0.0439
sin N	9.9692	cos N	9.5610	(4)	−0.2788
log (3)	8.6423 *n*	log (4)	9.4453 *n*	(3)+(4)	−0.3227

	Immersion.	Emersion.
log [(3)+(4)]	9.5088 *n*	9.5088 *n*
const. log	7.3038 *n*	7.3038
log r^2	2.8452	2.6133
colog cos ψ	0.0512	0.0512
log δP	9.7090	9.4771 *n*
	°	°
δP	+ 0.5	− 0.3
$N \mp \psi$	41.4	95.9
constant	0.0	180.0
Angle of position: P	41.9	275.6

from the north point of the Moon's limb toward the east, for direct image.

Pages 605–606 contain in detail all the data necessary for observing every occultation of the general list which is visible at Washington during the current year.

Page 607 contains the *Ephemeris for Physical Observations of the Sun.*

Pages 608–615 contain the *Ephemeris for Physical Observations of the Moon.* The selenographic longitudes are measured in the plane of the Moon's equator, the axis of reference being the radius of the Moon which passes through the mean center of the visible disk, positive toward the west—i. e., toward Mare Crisium—and the latitudes are measured from the Moon's equator, positive toward the north—i. e., in the hemisphere containing Mare Serenitatis.

The optical and physical librations in longitude and latitude have been computed with elements and formulæ given on pages xi and xii, and their sums are given in the second and third columns respectively, the physical libration being given separately in the fourth and fifth columns. The Sun's selenographic colongitude (90°− longitude) and latitude and the position-angle of the Moon's axis, C, in the sixth, seventh, and eighth columns, respectively, have all been corrected for the effect of physical libration.

When the libration in longitude is positive, the mean center of the disk is displaced toward the east—that is, the region thus exposed to view is on the west limb—and when the libration in latitude is positive the mean center of the disk is displaced toward the south—that is, the region thus exposed to view is on the north limb.

The altitude of the Sun, A, at any given time above the horizon of any point on the Moon whose selenographic longitude and latitude, λ and β, are known, may be computed from the following formula, the Sun's selenographic longitude and latitude being denoted by $l_\odot$ and $b_\odot$, respectively:

$$\sin A = \sin b_\odot \sin \beta + \cos b_\odot \cos \beta \cos (l_\odot - \lambda)$$

Pages 616–617 contain the data with reference to the illuminated disks of Mercury and Venus. The angle θ is the angle which the arc of the great circle from the planet to the Sun makes with the arc from the planet toward the west, measured in the direction west, north, east, south. It is measured from 0° to 360°. We may also regard θ as expressing the angle which the line of cusps makes with the meridian, the positive direction of the meridian being toward the north, and the positive direction of the line of cusps that in which a person following this line would have the illuminated portion of the disk on his right.

Pages 618–621 contain the *Ephemeris for Physical Observations of Mars.* The quantities here given have been corrected for aberration, so that in using them they should be interpolated to the actual time of observation.

P is the position-angle of the axis of rotation measured eastward from the north point of the disk.

$A_\oplus$ and $A_\odot$ are the planetocentric right ascensions of the Earth and Sun, respectively, measured in the plane of the planet's equator from its vernal equinox.

$D_\oplus$ and $D_\odot$ are the planetocentric declinations of the Earth and Sun, respectively, referred to the planet's equator.

$\odot_♂$ is the planetocentric longitude of the Sun measured in the plane of the planet's orbit from its vernal equinox.

k is the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.

i is the angle between the Sun and the Earth as seen from the planet.

q is the angular value of the greatest defect of illumination as seen from the Earth.

Q is the position-angle of the radius of the disk which passes through the point of greatest defect of illumination—that is, of the radius perpendicular to the line joining the cusps. It is measured eastward from the north point of the disk.

The column headed *Central Meridian* contains the longitude of the meridian which bisects the disk, measured from the adopted zero meridian.

The columns headed *Transit of Zero Meridian* contain the Washington Mean Time of every transit of the zero meridian across the actual center of the disk.

Page 622 contains, for the *Satellites of Mars*, the diagram of their orbits and the times of their elongations.

Pages 623–626 contain the *Ephemeris for Physical Observations of Jupiter.*

The columns headed *Central Meridian* contain the longitudes of the meridian which bisects the disk, measured from the adopted zero meridians for the equatorial region and from the meridian of the Great Red Spot, respectively.

The column headed *Correction for Phase* contains the corrections to be applied to the longitudes of the central meridian to obtain the longitudes of the meridian bisecting the illuminated disk.

The column headed *Transit of Zero Meridian* contains the Washington Mean Time of every fifth transit of the zero meridian across the center of the illuminated disk.

The column headed *Transit of Great Red Spot* contains the Washington Mean Time of every fifth transit of the meridian through the Great Red Spot across the center of the illuminated disk.

The remaining quantities used on pages 623–624 are the same as those defined under the *Ephemeris for the Physical Observations of Mars.*

Pages 627–655 contain, concerning the *Satellites of Jupiter*, the diagram of the orbits of Satellites I–V, the times of conjunction of Satellites I–IV, the times of elongation of Satellite V, the differences in right ascension and declination between Jupiter and Satellites VI and VII, and the phenomena of the Satellites I–IV together with their configurations.

Page 656 contains the *Magnitude of Saturn* and the *Elements of the Rings.*

Pages 657–663 contain, concerning the *Satellites of Saturn,* the diagram of the orbits of the seven inner satellites, the times of elongation for the first eight satellites, the differences in right ascension and declination between Saturn and Phœbe, the ninth satellite, and tables for predicting the position-angles and distances from the center of the planet of the first eight satellites.

Page 664 contains the diagram of the orbits of the satellites of Uranus, together with the times of their elongations.

Pages 665–666 contain tables for predicting the position-angles and distances from the center of the planet of the satellites of Uranus and Neptune.

Page 667 contains the diagram of the orbit of the satellite of Neptune, together with the times of its elongations.

Pages 668–669 contain the *Phenomena.* The predicted times of the conjunctions, quadratures, and oppositions of the planets with respect to the Sun are, respectively, the instants when the longitude of each planet differs from that of the Sun by 0°, ±90°, or 180°. For the conjunction of the planets with the Moon and with each other the predicted times are the instants when the two bodies have the same right ascension. The degrees and minutes to the right show the difference of declination at the moment of conjunction.

Pages 670–679 contain the *Positions of Observatories.* These have been compiled from various sources, and the data used are the best immediately available. The tabular arrangement is self-explanatory.

Page 680 contains two examples in the computation of lunar distances, which are inserted because the lunar distance tables have been omitted from the American Ephemeris since 1911.

Pages 681–699 contain a series of tables numbered from I to VI.

Table I—*For Finding the Latitude by an Observed Altitude of Polaris.*

Table II—For converting *Sidereal into Mean Solar Time.*

Table III—For converting *Mean Solar into Sidereal Time.*

Table IV—For finding the *Azimuth of Polaris at All Hour Angles.*

Table V—For finding the *Azimuth of Polaris at Elongation.*

Table VI—*For Finding the Times of Upper and Lower Culmination of Polaris.*

The following-named persons were engaged in the preparation of the American Ephemeris and Nautical Almanac for the year 1913:

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Andromedæ.

α 287
β 295
γ 303
δ 291
ε 291
ζ 292
ι 482
κ 483
λ 482
μ 294
ο 476
π 290
σ 288
υ 298
ψ 484
22 288

Antliæ.

α 373
θ 368
ι 377

Apodis.

α 404
γ 419
δ^1 417
θ 398
59 (G.) 426

Aquarii.

α 467
β 463
γ 470
δ 476
ε 457
η 472
θ 470
ι 468
λ 475
μ 457
ν 460
ξ 464
π 471
σ 471
τ 474
υ 472
φ 478
ψ 479
ω^2 483

Aquarii.

b^1 480
c^2 477
i^1 484

Aquilæ.

α 449
β 450
γ 448
δ 445
ε 441
ζ 442
η 449
θ 451
κ 446
λ 442
μ 446
τ 451
ω 444
1 438
2 439
6 439

Aræ.

α 428
β 427
δ 428
ϵ^1 424
θ 434

Argûs.

α 342
β 364
γ 356
δ 361
ε 358
η 375
θ 375
ι 365
λ 364
μ 375
ν 344
ξ 354
π 350
ρ 356
σ 352
τ 346
υ 368
φ 370
χ 355

Argûs.

ψ 367

Arietis.

α 303
β 302
δ 314
ε 311
ζ 315
ν 308
σ 310
τ 315
41 310

Aurigæ.

α 331
β 338
δ 338
ε 329
ζ 329
η 330
θ 339
ι 328
λ 332
μ 331
ν 337
ο 336
χ 334
ψ^1 341
ψ^6 345
51 343
63 348

Boötis.

α 400
β 407
γ 403
δ 409
ε 404
η 397
θ 401
λ 401
μ 410
ν^1 411
ρ 402
σ 403
τ 396
ψ 407
c 408
d 399

Boötis.

f 402
11 398
33 404

Bradley.

1147 357
1672 263
2777 460

Camelop.

β 329
4 327
9 328
17 333
43 345
2 H. 317
5 H. 319
9 H. 320
19 H. 331
22 H. 340
23 H. 343
25 H. 349
30 H. 263
32 H. 391

Cancri.

α 362
β 357
γ 360
δ 360
ζ 356
η 359
ι 361
κ 363
σ^2 362
ω 355
d^1 358
83 364

Can. Maj.

α 345
β 341
γ 348
δ 348
ε 347
ζ 340
η 351
θ 347

Can. Maj.

ξ^2 343
o^2 348

Can. Min.

α 352
β 351

Can. Ven.

α 392
2 386
8 388
17 H. 396
20 393

Capricorni.

α^2 452
β 452
γ 464
δ 465
ζ 463
θ 459
ι 462
μ 466
π 453
ρ 453
υ 455
ψ 456

Carinæ.

b^1 363

Cassiop.

α 291
β 287
γ 294
δ 297
ε 301
ζ 290
η 293
ι 306
μ 295
ο 292
ρ 485
ω 299
4 480
5 H^1. 478
21 292

Cassiop.

36 H. 307
38 298
40 298
50 303
55 304

Centauri.

α^2 403
β 398
γ 390
δ 385
ε 396
ζ 397
η 403
θ 399
ι 394
λ 382
π 381
n 391

Cephei.

α 462
β 464
γ 483
ζ 469
η 457
θ 454
ι 475
κ 451
ο 480
π 477
11 465
20 468
24 469
39 H. 275
41 H. 484
43 H. 251
47 H. 312
48 H. 314
51 H. 251
226 B. 472

Ceti.

α 312
β 292
γ 309
δ 308
ζ 301
η 295

Ceti.

θ 297
ι 288
μ 309
ν 307
ξ^1 304
ξ^2 307
ο 306
π 309
σ 307
τ 300
υ 302
2 486
12 290
13 290
20 293
67 305

Chamæleon.

β 387
δ^2 376
ζ 367
θ 359
π 382

Cœli.

α 327

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α 336
ο 332

Comæ.

20 387
24 389
31 391
43 393

Cor. Austr.

α 443

Cor. Bor.

α 412
β 411
ε 415
ζ 412
σ 417

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Corvi.

β 389
γ 386
δ 388
ε 385

Crateris.

α 377
β 379
δ 380
ζ 383

Crucis.

α^1 387
β 391
γ 388
δ 386

Cygni.

α 456
β 445
γ 453
δ 448
ε 457
ζ 461
θ 447
ι 446
κ 445
ν 458
ξ 459
ο 451
π^2 466
σ 461
τ 461
g 463
15 447
41 453
61 460
74 464

Delphini.

α 455
β 455
γ 456
δ 456
ε 454

Doradus.

α 326
δ 337

Draconis.

α 399
β 429
γ 433
δ 444
ε 449
ζ 425
η 420
θ 416
ι 410
κ 388
λ 381
ξ 432
ο 441
τ 445
χ 437
ψ 431
ω 430
A 421
1 H. 263
3 383
4 H. 385
9 H. 374
12 H. 413
35 432
36 436
50 440
76 275
79 467
220 H^1. 458

Equulei.

α 461

Eridani.

α 299
β 330
γ 321
δ 318
ε 317
ζ 315
η 311
θ 312
μ 327

Eridani.

ν 325
o^1 323
τ^2 311
τ^3 313
τ^5 318
τ^6 319
υ^5 324
φ 305
e 316
g 319
12 314
53 326

Fornacis.

β 310
κ 306
μ 305

Geminor.

α^2 352
β 353
γ 343
δ 350
ε 344
ζ 347
η 340
θ 346
ι 350
κ 353
λ 349
μ 341
ν 342
ξ 344
ρ 351
φ 354
χ 355
1 339
51 349

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750 251
848 326
944 251
966 334
1119 263
1308 351
1374 354

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1446 359
1450 359
1586 369
1706 377
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2164 405
2283 263
2320 417
2377 423
2533 435
3241 454
4163 485

Gruis.

α 468
β 473
γ 466
ε 474
ι 478

Herculis.

α 426
β 420
γ 419
δ 426
ε 424
ζ 422
η 423
θ 432
ι 430
κ 416
λ 428
μ 431
ξ 433
ο 435
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σ 421
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ω 420
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49 423
89 432
109 437
110 439

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μ 313
38 (G.) 315

Hydræ.

α 365
γ 394
δ 360
ε 361
ζ 362
θ 364
λ 371
μ 373
ν 376
ξ 382
π 399
σ 360

Hydri.

α 303
β 289
γ 320
δ 306
ε 308
θ 313
ι 316
λ 293
μ 308

Indi.

α 454
β 458
ε 467
ρ 475

Lacertæ.

α 471
3 471
10 472

Leonis.

α 370
β 383
γ 372
δ 379

Leonis.

ε 368
ζ 371
η 370
θ 380
ι 381
μ 369
ξ 366
ο 367
π 370
ρ 374
σ 380
τ 381
υ 382
χ 378
d 378
l 376
p^4 379
54 377

Leo. Min.

10 367
19 369
31 373
41 374
42 375
46 376

Leporis.

α 334
β 333
δ 337
ε 330
ζ 336
η 338
μ 331

Libræ.

α 405
β 409
γ 412
δ 407
ζ 411
ι 408
λ 414
ξ^2 406
2 401
8 405

Lupi.

β 406
γ 411
ζ 408

Lyncis.

2 340
8 342
15 347
24 353
26 354
27 355
31 357
40 365

Lyræ.

α 438
β 440
γ 442
θ 444
ι 443
R 441

Mensæ.

δ 325
ζ 346
31 487

Microscop.

γ 459
θ^1 462

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S 344
8 341
10 342
18 345
25 352
30 358

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α 389
δ 392

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γ^2 418

Octantis.

α 459
β 473
γ^1 485
δ 499
ζ 487
η 487
ι 499
κ 395
λ 465
ρ 410
σ 499
υ 499
χ 499
4 487
7 487

Ophiuchi.

α 429
β 430
γ 431
δ 417
ε 418
ζ 422
η 425
θ 427
κ 424
λ 421
ν 433
σ 428
b 427
30 424
67 433
70 434
72 434

Orionis.

α 338
β 332
γ 333
δ 334
ε 335
ζ 336
ι 335
κ 337
ν 339
π^3 327

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Orionis.

π^5 328
τ 332
φ^1 335
11 330

Pavonis.

α 452
β 455
γ 463
ε 450
ζ 438
η 430
λ 440

Pegasi.

α 477
β 476
γ 288
ε 465
ζ 473
η 474
θ 469
ι 468
λ 474
μ 475
π 469
τ 480
υ 481
φ 485
1 462
16 466
20 467
31 470
55 477
59 478
70 481
72 482

Persei.

α 316
β 314
γ 312
δ 318
ε 320
ζ 320
η 310
θ 309
ν 318
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τ 311
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φ 300
c 322
m 325
6 304

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α 289
β 295
γ 297
ε 287
μ 291
ψ 302

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221 406

Pictoris.

α 346

Pisc. Austr.

α 476
ε 473
3 460

Piscium.

γ 479
δ 293
ε 294
ζ 296
η 298
θ 481
ι 483
κ 481
ν 300
ξ 302
ο 300
π 299
τ 296
υ 297
ω 486
f 296
30 486
33 287
44 289

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1 (G.) 339
4 353
20 357

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α 361
θ 365

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β 447
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δ 448

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ε 436
ζ 442
η 435
ι 449
λ 437
μ 435
π 443
σ 440
φ 439
ψ 443
c 450
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f 448
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54 447

Scorpii.

α 420
β 416
γ 407
δ 415
ε 423
η 425
ι^1 431
λ 429
π 415
σ 418

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Scorpii.

τ 421
24 422

Sculptoris.

α 294
β 482
γ 479
δ 484
ε 301

Serpentis.

α 412
β 413
γ 415
ε 414
η 436
θ 441
κ 413
μ 413
ξ 429
τ^1 410
c 438
3 409

Sextantis.

6 369
33 374

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α 325
β 333
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ε 324
ζ 335
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ι 329
λ 321
μ 323
ν 322
ξ 317
ο 316
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Telescopii.

α 437

Trianguli.

α 301
β 304
γ 305

Tri. Austr.

α 422
β 414
γ 408

Tucani.

α 470
γ 479
ε 486
ζ 289
κ 296

Urs. Maj.

α 378
β 378
γ 384
δ 386
ε 392
ζ^1 394
η 397
θ 366
ι 362
κ 363
λ 372
μ 372
ν 380
ο 358
σ^2 363
υ 368
ψ 379
χ 383
d 366
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α 251
β 406
γ 409
δ 275
ε 275
ζ 414
η 419
λ 275
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5 402
19 418

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q 371

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α 394
β 384
γ 390
δ 392
ε 393
ζ 395
η 387
θ 393
ι 400
κ 400
λ 401
μ 404
ο 385
π 384
ρ 390
τ 398
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